Draft
ENVIRONMENTAL IMPACT STATEMENT
for the
Montana Alberta Tie Ltd. (MATL) 230-kV Transmission Line

March 2007

State of Montana
Department of Environmental Quality

United States
Department of Energy

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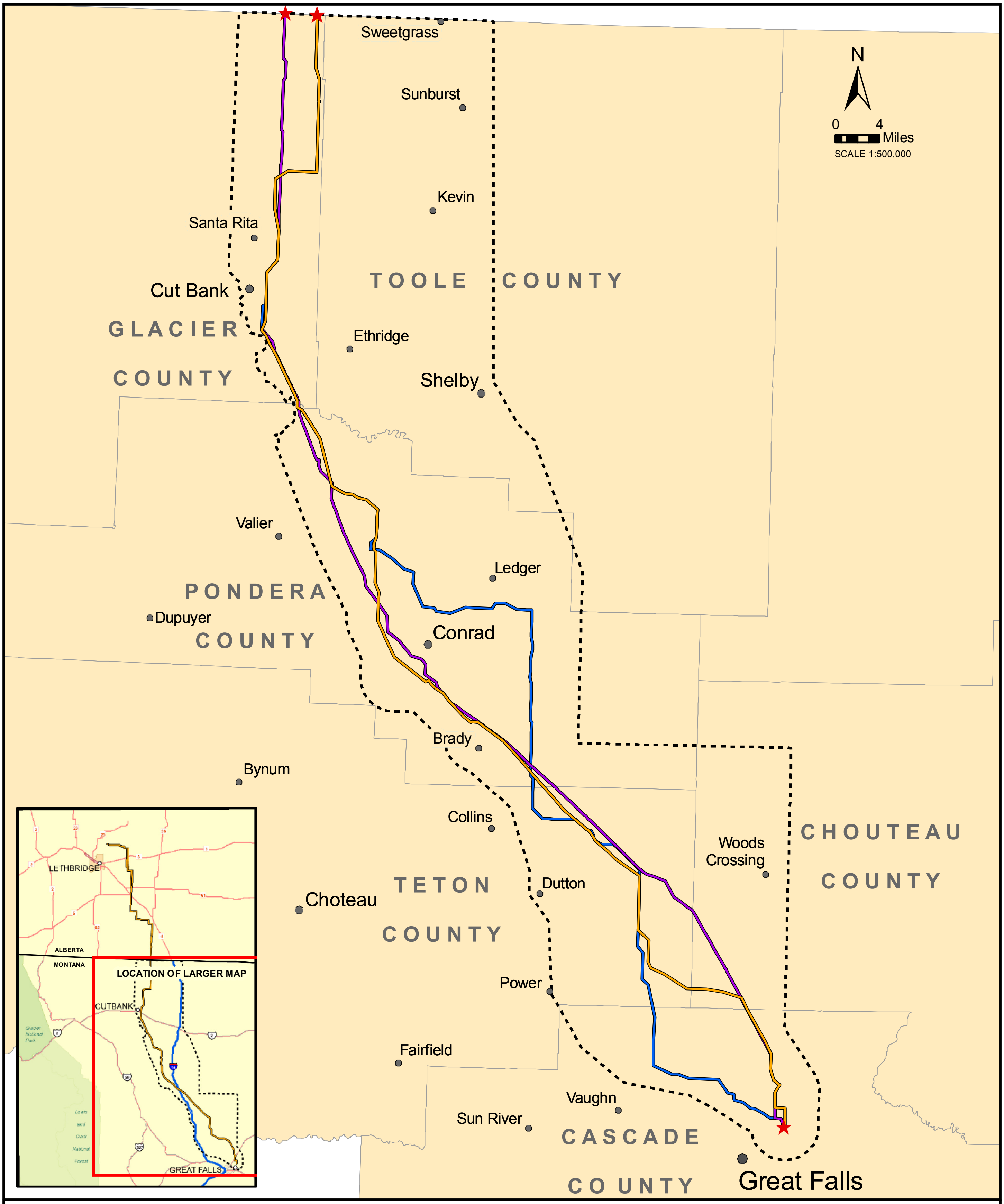
Executive Summary

Introduction

This document is both a Montana State draft environmental impact statement (EIS) and a federal environmental assessment (EA) and has been prepared for the United States portion of the proposed Montana Alberta Tie Ltd. (MATL) transmission line. Because of the similarities of their environmental reviews, and to reduce the burden and expense of preparing separate documents, Montana and the U.S. Department of Energy have cooperated in the preparation of this single environmental document. The project considered in this document is an international 240/230-kilovolt (kV) alternating current merchant (private) transmission line that would originate at an existing NorthWestern Energy (NWE) 230-kV switch yard near Rainbow Dam at Great Falls, Montana, and extend north to a new substation to be constructed northeast of Lethbridge, Alberta, crossing the U.S.-Canada international border north of Cut Bank, Montana. Approximately 130 miles of the 203-mile transmission line are proposed to be constructed in the U.S. The line would be owned by MATL, a private Canadian corporation owned by Tonbridge Power. The proposed line would be part of the Western Interconnection (western grid), and a phase shifting transformer would be installed at the substation near Lethbridge to control the direction of power flows on the line.

MATL has submitted an application for a certificate of compliance (certificate) to the Montana Department of Environmental Quality (DEQ) under the Montana Major Facility Siting Act (MFSA)(75-20-101, et seq., Montana Code Annotated [MCA]). This application addresses the portion of the transmission line between Great Falls and the border between the U.S. and Canada. MATL has applied to the U.S. Department of Energy (DOE) for a Presidential permit (permit) to construct, operate, maintain and connect facilities for the transmission of electric energy at the U.S.-Canada international border. **Figure ES-1** provides a map showing the location of the proposed facility and alternatives.

In response to the application for a certificate, DEQ must prepare a report and may conduct an environmental review and approve the proposed project before construction may begin. These reviews are required by the Montana Environmental Policy Act (MEPA) and MFSA. The DOE action also requires an environmental review conducted in accordance with the National Environmental Policy Act (NEPA). Further information on the regulatory requirements and responsibilities is included in Section 1.4 of the EIS.


Sweetgrass
Sunburst
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0 4 Miles
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Kevin
Santa Rita
Cut Bank
TOOLE COUNTY
GLACIER COUNTY
Ethridge
Shelby
Valier
Ledger
PONDERA COUNTY
Dupuyer
Conrad
Brady
Bynum
Collins
CHOUTEAU COUNTY
Woods Crossing
TETON COUNTY
Choteau
Dutton
Power
Fairfield
Vaughn
Sun River
CASCADE COUNTY
Great Falls
LETHBRIDGE
ALBERTA
MONTANA
LOCATION OF LARGER MAP
CUTBANK
GREAT FALLS

FIGURE ES-1
PROJECT STUDY AREA

LEGEND
ALT2 - ALIGNMENT
ALT3 - ALIGNMENT
ALT4 - ALIGNMENT
● CITIES AND TOWNS
★ ALIGNMENT END AND EXIT POINTS
STUDY AREA BOUNDARY

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE FigSum1_MATL_Project_Study_Area_022107_JA.mxd

Purpose and Benefits of the Montana-Alberta Tie Transmission Line Project

This section describes the purpose and benefit of the proposed action to the State of Montana as required under MEPA and MFSA (Section 1.2.1). This section also addresses purpose and need for the federal action and purpose and benefit to the applicant (Section 1.2.2) and the need for the facility (Section 1.2.3). DEQ must make several findings, including a finding of need, before a certificate can be issued under MFSA. Under MFSA, consideration must be given to the benefits of the project to the applicant and to the state.

Purpose and Benefit to the State of Montana

The purpose of issuing a certificate of compliance and a Presidential permit for the proposed MATL transmission line is to allow MATL to connect the Montana electrical transmission grid with the Alberta electrical transmission grid (no direct connection currently exists). This region of Montana has a high potential for development of wind resources. A connection could provide access to markets for new wind generation facilities in the vicinity of the proposed transmission line and improve transmission access to markets seeking new energy resources. Expected benefits of the proposed Project are summarized below and examined in detail in Section 3.16.

Benefits to Electricity Generators and Consumers in Montana

The proposed transmission line would have the capacity to carry up to 300 MW north and 300 MW south for a total capacity of up to 600 MW. However, due to constraints on the current system where MATL would tie in at Great Falls, the full capacity of 300 MW to the south would not be realized unless additional upgrades are made. The added capacity from MATL could support a modest increase in new power generation in Montana. While larger amounts of new generation would need more transmission capacity, the construction and operation of the proposed Project would provide opportunities for development of smaller energy generation projects, such as wind energy, in Montana. If the proposed transmission line is approved, MATL will have already sold most of the total capacity of the line to potential wind farms before construction begins. Information regarding energy generation companies already contracted with MATL is provided in Section 2.6.

Additional expected benefits to Montana generators and consumers include: additional connection with markets that demand energy; additional wholesale electricity purchasing options for Montana utilities, which could result in lower rates due to an increase in supplier competition; and increased opportunities for western grid system optimization during high Montana export and low Alberta-BC export scenarios.

Benefits to Existing Transmission Systems

A modified transmission system, including a tie line between Montana and Alberta, may also result in benefits to transmission system operators whose service areas include Montana and to utilities that provide transmission service within the state. A modified transmission system could provide more options for power routing within Montana, increase energy transactions between Montana and Alberta, and allow for easier balancing of energy surpluses and shortages within and between balancing authority areas. Because tie lines are able to connect with adjacent electric systems, different generation resources can combine to provide a level of reliability that one jurisdiction could not otherwise afford if that jurisdiction had to cover the same resources independently. The MATL line could also create another opportunity for Montana's largest privately owned transmission and distribution utility, NorthWestern Energy, to obtain regulating reserves for its transmission system control area.

Benefits as Stated by the Applicant

The MATL transmission line is a merchant line the primary purpose of which is to financially benefit the owner/operators. The MATL application for certification described the following benefits to MATL, the U.S., and Canada (MATL 2006b):

> *The Project would be the United States' first power transmission interconnection with Alberta and is expected to facilitate development of additional sources of generation (e.g., windfarms both in northern Montana, and southern Alberta), and improve transmission system reliability in Montana, Alberta, and on a regional basis in both the U.S. and Canada. In addition, the Project would promote increased trade in electrical energy across the international border, and provide a transmission route to balance energy surplus/shortage situations in an efficient and economic manner.*

In addition, MATL asserts that system stability studies conducted under the direction of the Western Electricity Coordinating Council Peer Review Group indicate that the proposed Project would not adversely affect transmission system stability (Tonbridge Power, Inc. 2007).

Need for the Facility

The need for this line is the additional transfer capacity it would provide, if built. This line would directly connect Montana and Alberta's regional operating transmission systems, and would allow power to flow directly between these two systems where there is no current connection.

Because Montana makes more electricity than it consumes, to be economically viable, any new generation resources in Montana must offer competitive pricing and have adequate transmission access to compete in out-of-state markets or replace an existing supplier choosing to take higher profits by selling out of state (DEQ 2004). Either way, additional transmission capacity is not needed to serve Montana customers, but it is essential for the viability of new generation enterprises (DEQ 2004).

This line could support a modest increase of new electricity generators, such as wind, in the study area by connecting them to regional grids and thus potentially to electricity markets. The MATL transmission line is proposed to be capable of shipping up to 300 MW north and 300 MW south. The amount of new generation that would be able to be shipped south into Montana by MATL is currently unknown due to potential transmission constraints south of Great Falls, which is the southern terminus of MATL. To the extent that southerly electrical flows on MATL are constrained, this would reduce MATL's ability to meet the need for increased capacity. It also may result in more electricity flowing north from Montana into Alberta than from Alberta to Montana.

Issues Identified During Scoping

DOE issued a "Notice of Intent to Prepare an Environmental Assessment and to Conduct Public Scoping Meetings and Notice of Floodplain and Wetlands Involvement; Montana Alberta Tie, Ltd." in the *Federal Register* on November 18, 2005 (70 FR 69962). In addition, DOE mailed a copy of the notice, using Montana land ownership records, to each owner of land on the MATL-proposed corridor.

DEQ and DOE hosted four public meetings in December 2005 and June 2006 at which time the public was asked to identify issues and concerns to be addressed during the review. During each meeting, MATL and DEQ representatives presented briefings. Maps and other information were available for review, and representatives from each agency were available to discuss the project, answer questions, and receive public comments.

Meeting dates and locations are listed below:

- Conrad on Monday, December 5, 2005, at Norley Hall,
- Great Falls on Tuesday, December 6, 2005, at the Great Falls Civic Center,
- Cut Bank on Wednesday, December 7, 2005, at the Glacier County Voting Center, and
- Cut Bank on Monday, June 26, 2006, at the Cut Bank Civic Center.

Additionally, throughout the scoping process, stakeholders expressed their concerns via letters, phone calls, and emails.

Other agencies having interest or responsibility in the project approval process include: Montana Fish, Wildlife and Parks, Montana State Historic Preservation Office (SHPO), Montana Department of Natural Resources and Conservation, U.S. Department of Agriculture Farm Services Administration, U.S. Bureau of Land Management, and U.S. Fish and Wildlife Service.

Based on comments received from participating agencies and the public, ten issues and concerns were identified. These issues are (1) impacts on farming, ranching, and other land uses, (2) impacts on protected, threatened, endangered, and sensitive animal and plant species and their critical habitats (3) impacts on floodplains and wetlands, (4) avian mortality, (5) impacts on cultural and historic resources, (6) impacts on human health and safety, (7) impacts on air, soil, and water, (8) visual impacts, (9) socioeconomic impacts, and (10) impacts from development of wind generation projects.

Alternatives Description

A complete discussion of how alternatives were developed, alternatives considered but dismissed from full analysis, and complete descriptions of the four alternatives considered for detailed analysis is provided in Chapter 2. A summary of the four alternatives is presented below. Alternatives considered but dismissed are also listed below.

Alternative 1 — No Action

Under Alternative 1, the proposed Project would not be approved or implemented. Existing electrical transmission service in north-central Montana would be maintained and operated at its current level. In addition, plans to construct new generation facilities, primarily wind, in the analysis area would likely not be realized.

Alternative 2 — Proposed Action

Alternative 2 is to construct and operate a 230-kV merchant power line between Great Falls, Montana and Lethbridge, Alberta as described in MATL's application to DEQ (MATL 2006b) and its application for a Presidential permit before DOE. The Alternative 2 proposed alignment is 129.9 miles long and extends from the 230-kV Great Falls switch yard north of Great Falls to a proposed new substation near Cut Bank, and extend north to the Montana-Canada border at the western edge of the Red Creek Oil Field. The transmission line would be built using H-frame structures.

Alternative 3 – MATL B

Alternative 3 would be 121.6 miles long and would be similar to Alternative 2 in that the width of the right of way, pole design, types of access roads, implementation, structures, conductors, markers, substations, construction, operations, maintenance, and potential environmental protection measures would be the same as those described for Alternative 2. The Alternative 3 alignment would be different from Alternative 2 in that it would generally parallel an existing 115-kV transmission line along the entire route from the Great Falls switch yard to a substation near Cut Bank. Alternative 3 was designed by MATL based on a single preferred location MFSA siting criterion that recommends paralleling existing utility corridors (Circular MFSA-1, section 3.1). This alternative alignment was not intended to address potential land use issues or maintenance issues.

Alternative 4 – Agency-Developed

Alternative 4 was developed by DEQ within MATL's study area to address concerns raised by the public and interested agencies during the scoping period. Issues of concern that helped shape Alternative 4 are: potential adverse impacts to farmers from diagonal crossings of farm fields using H-frame structures, limitations on private property use due to crossings on private land and disturbance of visual resources. The alignment under Alternative 4 would be 139.6 miles long and would be generally constructed along field boundaries and where diagonal crossings could impact farming practices or other private land use. Public land was used when its use would be as economically practicable as the use of nearby private land. Alternative 4 also includes additional environmental protection measures recommended but not required under Alternatives 2 and 3. The use of monopoles would be required where the line would cross cropland and Conservation Reserve Program (CRP) land. The width of the right of way, project implementation, conductors, markers, substations, types of access roads, construction, operations, and maintenance would be the same as Alternatives 2 and 3.

Alternatives Considered But Dismissed

Several alignment and construction-detail alternatives were considered but eliminated from detailed study.

- Many local realignment options
- MATL C alignment
- Building the line underground
- Unguyed, self-supporting angle and dead-end structures
- Requiring the use of helicopters to string the line
- Requiring monopole structures in all areas
- Cut Bank to Shelby alternatives
- NWE 115-kV transmission line rebuild alternative

Affected Environment

The 1,444,790 acre Project study area contains sparsely populated semi-arid rolling hills, gentle ridges, and plateaus bisected by alluvial corridors of the Marias and Teton rivers and their tributaries. The area has low topographic relief with elevations ranging from 4,372 feet above sea level in the northwest corner of the study area to about 3,016 feet above sea level on the Missouri River in the southeast corner of the area. Winters are extremely cold with desiccating winds and snow. May and June are the wettest months; however, perennial streams and rivers are sustained primarily from moisture derived from mountain snowpack.

The bedrock geologic units are primarily glaciated Cretaceous shales and sandstones (MATL 2006b). This region includes portions of eight hydrologic subbasins in Montana, all of which contribute to the lower Missouri River Basin. The primary surface water features in the analysis area are Cut Bank Creek, the Marias River and the Dry Fork Marias River, Pondera Coulee, the Teton River, Benton Lake, Hay Lake, and the Missouri River. Isolated prairie potholes, lakes, and stock reservoirs are scattered throughout the analysis area.

The majority of the land (90 percent) is privately owned, with the remainder being owned or managed by state, federal, and local government agencies. Over 88 percent of the Project study area is considered agricultural lands, including irrigated and non-irrigated cropland and rangeland. Some dry land crops and grazing occur on state and federal lands. Management of agricultural lands includes the use of GPS guided tractors, sprayers, and combines, and irrigation equipment, and aerial and ground based spraying, mechanical plowing, seeding, fertilizing, and harvesting. These activities occur on 73 percent of the Project study area. This agricultural land base gives the landscape its characteristic and dominant patterns of linear strips of dryland cultivation and circular and rectangular shapes associated with irrigated fields. Portions of Cascade, Chouteau, Glacier, Pondera, Teton, and Toole counties are in the Project study area.

Numerous oil and gas fields are located within the northern portion of the analysis area. Pipelines between 8 and 20 inches in diameter occur within or traverse the Project study area including gathering system main lines and transmission/trunk lines. Existing electric and magnetic field (EMF) levels in the project vicinity are primarily dominated by EMF from common household appliances. Existing transmission and distribution lines also contribute to EMF levels.

Comparison of Alternatives and Impacts

Table ES-1 summarizes potential impacts from the proposed Project and action alternatives to land use, geology, soils, safety, hazardous material management, electric and magnetic fields, water, wetlands, vegetation, wildlife, fish, special status species, air quality, noise, socioeconomics, paleontological resources, cultural resources, visual resources, and the existing transmission system.

Under Alternative 1, the no action alternative, the proposed 230-kV transmission line would not be built, and the impacts described in **Table ES-1** would not occur.

TABLE ES-1
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Summary of Impacts**
Land Use – General Impacts	Potential impact compared to other alternatives depends on length of alignment in general, and length on cropland.	Potential impact compared to other alternatives depends on length of alignment in general, and length on cropland.	Potential impact compared to other alternatives depends on length of alignment in general, and length on cropland.	Loss of production due to structures and roads, increased risk of weed introduction and spread, risk of equipment damage from hitting a structure, increased time to farm around poles, and some GPS-guided equipment may be affected. Cropland crossings also increase the risk of crop duster accidents.
Land Use – General Impacts	Similar for all alternatives	Similar for all alternatives	Similar for all alternatives	During construction, facility construction traffic may conflict with movement of farm equipment on roads.
Land Use- Total Amount of Land Crossed	129.9 miles	121.6 miles	139.6 miles	Alt 3 would disturb the least amount of land. Alt 4 would disturb the most.
Land Use – Total Cropland crossed	92.7 miles	97.7 miles	87.9 miles	Alt 4 crosses the least cropland. Alt 3 crosses the most cropland.
Land Use – Total Cropland Crossed Diagonally	52.9 miles	70.4 miles	27.1 miles	Alt 4 crosses the least cropland diagonally. Alt 3 crosses the most diagonally.
Land Use – Guaranteed Use of Monopoles On Cropland	No	No	Yes	Alt 4 requires the use of monopoles for crossing all cropland, Alts 2 nd 3 would use monopoles at the discretion of MATL.
Land Use –Special Management Areas Crossed	11.2 miles	6.4 miles	11.2 miles	Alt 3 would cross the least amount of special management areas. Alt 4 would avoid the Great Falls Shooting Sports Complex
Land Use – Conservation Easements Crossed	23.6 miles	18.1 miles	32.5 miles	Alt 3 would cross the least amount of conservation easements. Alt 4 would cross the most.
Land Use – Proximity to Residences	1 residential development within 100 feet of alignment.	4 residential developments within 100 feet.	1 residential dev. within 100 feet of alignment.	Alts 2 and 4 have the fewest residential developments close to the alignment.

TABLE ES-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Land Use – Length of 500-foot-wide Alignment Buffer Zone Within 100 feet of a Pipeline	7.0 miles	23.7 miles	5.7 miles	Alt 4 has the least amount of the 500-foot alignment buffer zone near pipelines. Alt 3 contains the greatest length of alignment near pipelines.
Land Use – Impacts to Roads and Road Use	Increased traffic on roads during construction resulting in occasional conflicts with farm machinery.	Same as Alternative 2	Same as Alternative 2	All alternatives have similar impacts.
Geology – Miles on Soil and Geologic Resources Prone to Mass Movement	9 miles	3 miles	20 miles	Alt 3 would have the least risk of causing mass movement that could result in pole instability. Alt 4 presents the greatest risk.
Soils – Miles on Unstable Soils	10 miles	12 miles	24 miles	Alt 2 would have the least risk of soil erosion. Alt 4 presents the greatest risk. Soil erosion impacts can be mitigated under all alternatives.
Engineering	No adverse impact to structural reliability is anticipated	Same as Alt 2	Same as Alt 2	All facilities are proposed to be constructed in compliance with accepted engineering standards.
Hazardous Materials	No impact to resources from hazardous materials is anticipated	Same as Alt 2	Same as Alt 2	MATL proposes to manage and transport hazardous materials and wastes in accordance with State and federal requirements.
EMF – Exposure Levels	No impact	Same as Alt 2	Same as Alt 2	Exposure levels would not exceed state standards for electric fields.
EMF – Radio or TV Interference	No impact	Same as Alt 2	Same as Alt 2	No alternative is expected to interfere with radio or TV reception.

TABLE ES-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Water – General Impacts	Potential impact compared to other alternatives is dependent on number of river crossings.	Potential impact compared to other alternatives is dependent on number of river crossings.	Potential impact compared to other alternatives is dependent on number of river crossings.	Minor short-term adverse impacts to surface water quality could occur by temporarily increasing sources of sediment from the time of construction to reclamation completion. This impact would be mitigated if water and riparian areas are undisturbed or measures to reduce sediment transport are installed.
Water – Potential Number of Perennial Stream or River Crossings	10	6	17.	Alt 3 poses the lowest risk and Alt 4 poses the highest risk of contributing sediment to streams based on number of stream crossings.
Water – Potential Number of Lake Crossings	4	6	2.	
Wetlands - General	Potential impact compared to other alternatives is dependent on acres of crossed wetlands	Potential impact compared to other alternatives is dependent on acres of crossed wetlands	Potential impact compared to other alternatives is dependent on acres of crossed wetlands.	Construction disturbance could result in a change in wetland plant community if wetland hydrology is altered. This impact would be mitigated if wetlands were undisturbed during construction and maintenance.
Wetlands – Total Wetlands and Potential Wetlands Crossed	67.6 acres	62.3 acres	76.4 acres	Alt 3 crosses the least amount of ground that contains wetlands and potential wetlands. Alt 4 crosses the greatest amount of wetlands and potential wetlands.
Vegetation - General	Potential impact compared to other alternatives depends on acres of disturbed native vegetation	Potential impact compared to other alternatives depends on acres of disturbed native vegetation.	Potential impact compared to other alternatives depends on acres of disturbed native vegetation.	Temporary loss of vegetation and increased risk of weed emergence and dispersion in disturbed areas until reclaimed.
Vegetation – Potential loss during construction	38 acres	41 acres	48 acres	Alt 2 would disturb the least amount of native vegetation; Alt 4 would disturb the largest acreage.

TABLE ES-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Wildlife - General	Impacts greatest for birds and animals with low mobility.	Same as Alt 2	Same as Alt 2	Short-term impacts include loss of individuals during construction or direct disturbance of species during critical periods in their life-cycles. Long-term impacts include habitat alterations, electrocutions, and collisions. Impacts would be similar for all alternatives.
Wildlife- Crosses Mule Deer Habitat	19 miles	10 miles	28 miles	Minor to no impact to mule deer population relative to the size of the existing habitat and individual mobility.
Wildlife – Birds	Collisions with transmission line could result in bird loss. Portions of the line located near wetlands and the Benton Lake National Wildlife Refuge would experience bird collisions.	Because the line length and location are similar to the existing 115-kV line in Alt 1 (within 1% difference) and both pass near wetlands and the Benton Lake National Wildlife Refuge, impacts to wildlife would be similar to Alt 2.	Same as Alt 3	Bird collision potential is similar for all alternatives.
Fish – Expected Impacts to Water Quality	10 perennial river or stream crossings	6 perennial river or stream crossings	17 perennial river or stream crossings	Alt 3 poses the lowest risk of affecting fish habitat by contributing sediment to streams based on the number of stream crossings.
Special Status Species - Vegetation	All known occurrences are located outside the study area	Same as Alt 2	Same as Alt 2	Risk to vegetation special status species is based on risk to its habitat (wetlands). Alt 3 has the least likelihood of affecting vegetation species of concern because the alignment crosses less riparian habitat than Alts 2 and 4.
Special Status Species – Wildlife Habitat	19.9 miles	11.3 miles	11.7 miles	Alts 3 and 4 would cross the least amount of habitat type used by special status species wildlife.

TABLE ES-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Air Quality - General	Some localized short-term emissions of particulate matter would occur during construction.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Audible Noise - General	Short-term, localized construction noise. Noise from rain or wind on the transmission line would be below BPA and HUD guidelines.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Social Resources	Increased short-term construction and long-term maintenance employment opportunities	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics – Short Term	Short-term construction-related employment would be available.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics - Counties	Long-term operation and maintenance employment would be available. County and State tax revenues would increase.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics - State	Opportunities to export electric power would increase. Increased competition may reduce cost to ratepayers. Creation of opportunities to start up wind generation facilities.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact

TABLE ES-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Paleontological Resources – Miles of Geologic Units Crossed With a High Probability of Containing Fossils.	51.6 miles	44.3 miles	44.6 miles	Alt 3 would cross the fewest miles having a surface expression of the Two Medicine Formation, which has a high probability of containing fossils. Alt 2 would cross the most miles over the Two Medicine Formation.
Cultural Resources- Number of Cultural Resources Crossed	Crosses 6 sites eligible for the NRHP and 13 sites of undetermined eligibility.	Crosses 7 sites eligible for the NRHP and 9 sites of undetermined eligibility.	Crosses 3 sites eligible for the NRHP and 20 sites of undetermined eligibility.	Alt 3 would pose a risk to the lowest number of cultural resource sites. Alt 4 would pose a risk to the greatest number of cultural resource sites.
Visuals - General	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast	Decline in aesthetic quality of a view shed, visual contrast or landscape change due to contrast with natural landscape.
Visuals – Residences within ¼ mile	17 residences	23 residences	22 residences	Alt 2 would be visible from the fewest residences within ¼ mile. Alts 3 and 4 would have similar proximity to residences.
Visuals – Number of Residences ¼ - ½ Mile	60 residences	71 residences	45 residences	Alt 4 would be visible from the fewest residences within ¼ to ½ mile. Alt 3 would be visible from the most residences.
Visuals – Within ½ mile from a Travel Corridor	6.1 miles	7.6 miles	5.0 miles	Alt 4 would be visible from the shortest length of a travel corridor within ½ mile. Alt 3 would have the longest visibility.

Notes:

Alt	Alternative	BPA	Bonneville Power Administration
EMF	Electric and Magnetic Field	EPA	U.S. Environmental Protection Agency
Est	estimated	GPS	Global Positioning System
HUD	U.S. Housing and Urban Development	L & C	Lewis and Clark County
NRHP	National Register of Historic Places	TV	Television

1.0 Purpose and Benefit of the Proposed Action

This document is both a Montana State draft environmental impact statement (EIS) and a federal environmental assessment (EA) and has been prepared for the United States portion of the proposed Montana Alberta Tie Ltd. (MATL) transmission line. Because of the similarities of their environmental reviews, and to reduce the burden and expense of preparing separate documents, Montana and the U.S. Department of Energy have cooperated in the preparation of this single environmental document. The project considered in this document is an international 240/230-kilovolt (kV) alternating current merchant (private) transmission line that would originate at an existing NorthWestern Energy (NWE) 230-kV switch yard near Rainbow Dam at Great Falls, Montana, and extend north to a new substation to be constructed northeast of Lethbridge, Alberta, crossing the U.S.-Canada international border north of Cut Bank, Montana. Approximately 126 miles of the 203-mile transmission line is proposed to be constructed in the U.S. The line would be owned by MATL, a private Canadian corporation owned by Tonbridge Power. The proposed line would be part of the Western Interconnection (western grid), and a phase shifting transformer would be installed at the substation near Lethbridge to control the direction of power flows on the line.

MATL has submitted an application for a certificate of compliance (certificate) to the Montana Department of Environmental Quality (DEQ) under the Montana Major Facility Siting Act (MFSA)(75-20-101, et seq., Montana Code Annotated [MCA]). This application addresses the portion of the transmission line between Great Falls and the border between the U.S. and Canada. MATL has applied to the U.S. Department of Energy (DOE) for a Presidential permit (permit) to construct, operate, maintain and connect facilities for the transmission of electric energy at the U.S.-Canada international border. **Figure 1.1-1** provides a map showing the location of the proposed facility and alternatives.

In response to the application for a certificate, DEQ must conduct an environmental review and approve the proposed project before construction may begin. This review is required by the Montana Environmental Policy Act (MEPA) and MFSA. The DOE action also requires an environmental review conducted in accordance with the National Environmental Policy Act (NEPA). Further information on the regulatory requirements and responsibilities is included in Section 1.4.

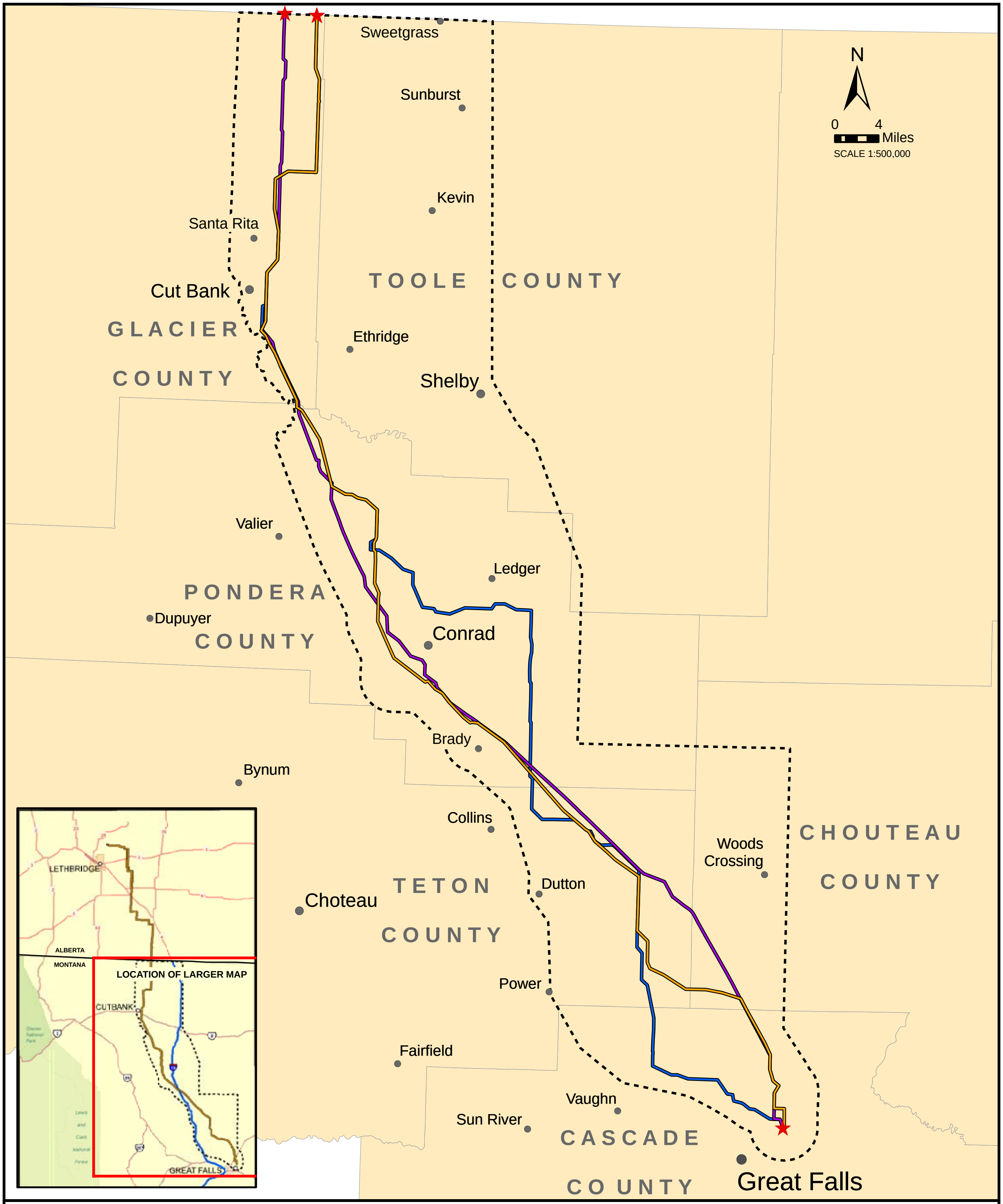

Sweetgrass
Sunburst
Kevin
Santa Rita
Cut Bank
TOOLE COUNTY
GLACIER COUNTY
Ethridge
Shelby
Valier
Ledger
PONDERA COUNTY
Dupuyer
Conrad
Brady
Bynum
Collins
Woods Crossing
CHOUTEAU COUNTY
Choteau
TETON COUNTY
Dutton
Power
Fairfield
Vaughn
Sun River
CASCADE COUNTY
Great Falls
N
0
4
Miles
SCALE 1:500,000
LETHBRIDGE
ALBERTA
MONTANA
LOCATION OF LARGER MAP
CUTBANK
GREAT FALLS

FIGURE 1.1-1
PROJECT STUDY AREA

LEGEND

- ― ALT2 - ALIGNMENT
- ― ALT3 - ALIGNMENT
- ― ALT4 - ALIGNMENT
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- ⬚ STUDY AREA BOUNDARY

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig1_1-1_MATL_Project_Study_Area_020107_JA.mxd

General DOE Requirements

The Department of Energy has the responsibility for implementing Executive Order (E.O.) 10485 (September 9, 1953), as amended by E.O. 12038 (February 7, 1978), which requires the issuance of a Presidential permit for the construction, operation, maintenance, and connection of electric transmission facilities at the United States international border. DOE may issue the permit if it determines that the project is in the public interest, and after obtaining favorable recommendations from the U.S. Departments of State and Defense. The criteria used by DOE to determine if a proposed project is consistent with the public interest are:

1. Assessment of potential environmental impacts in accordance with the National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality and DOE implementing regulations at 40 CFR §§ 1500-1508 and 10 CFR§ 1021, respectively;
2. Assessment of the project's impact on electric reliability, that is, ascertaining whether the proposed project would adversely affect the operation of the U.S. electric power supply system under normal and contingency conditions, and any other fact on the operating reliability of the U.S. electric supply system; and,
3. Any other factors that DOE may consider relevant to the public interest.

General MEPA and MFSA Requirements

Under MEPA, DEQ must state the purpose and benefit of the permitting action by addressing each item listed below. Each item is followed by the corresponding section in which it is addressed (Mundinger et al 2006):

- Explain the benefits and purpose of the proposed action (Section 1.2);
- Explain the decision(s) that must be made regarding the proposed action (Section 1.3);
- Describe any other environmental review documents that influence or supplement the EIS (Section 1.3);
- List other local, state, or federal agencies that have overlapping or additional jurisdiction or responsibility for the proposed action (Section 1.4);
- List all necessary permits and licenses (Section 1.4); and
- Describe the concerns and issues that have been generated through public and agency comments (Section 1.5).

This section also briefly describes alternatives to the proposed action (Section 1.3.1). Terms used throughout the EIS to describe different aspects of the study area and units of electricity transmission are defined in Section 1.7. MATL's proposed Project and alternatives to the Project are presented in Chapter 2, along with reasonably foreseeable actions and alternatives considered but dismissed. Chapter 3 presents the affected environment and impacts analysis. Cumulative impacts, unavoidable adverse impacts, and irreversible and irretrievable impacts are presented in Chapter 4. Consultation and coordination with other agencies and interested groups is presented in Chapter 5. The list of people who prepared this document is presented in Chapter 6. Chapter 7 presents a glossary and acronym list. Chapter 8 is reserved for responses to public comments on the draft EIS. And references are presented in Chapter 9.

Appendices follow the references and include:

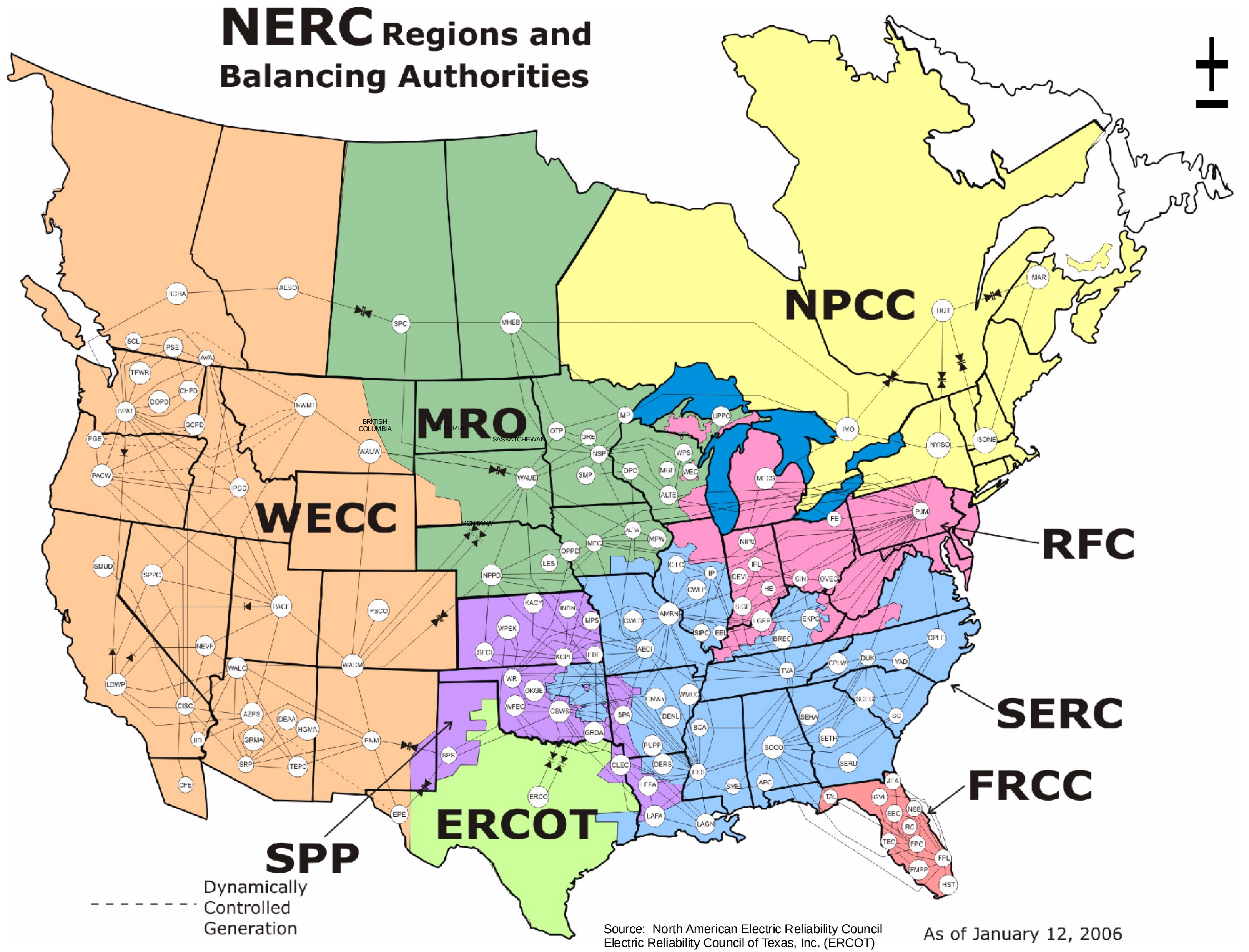
Appendix A — DEQ Eight Local Realignment Segments Preliminary Analysis
Appendix B — Types of H-frame Structures
Appendix C — MATL Noxious Weed Control Plan
Appendix D — Draft MATL Reclamation & Revegetation Plan
Appendix E — Description of Drainages and Wetland Areas That Would Be Avoided
Appendix F — Draft DEQ Environmental Specifications
Appendix G— Alternatives Considered But Dismissed by MATL
Appendix H — Land Use Types By Milepost
Appendix I — Impaired River Segments Summary Sheets
Appendix J — Summary of Surface Water Resources and Water Quality in the Analysis Area
Appendix K — Priority Pollutant Monitoring Data
Appendix L — Photographic Simulations
Appendix M — MATL System Impact Study (SIS) Stand-Alone and Co-existing

1.1 Project Background

The North American transmission grid moves electricity from power generating facilities to customers using a transmission system coordinated by the North American Electric Reliability Council (NERC). Members of NERC are investor-owned utilities, federal power agencies, rural electric cooperatives, state, municipal and provincial utilities, independent power producers, power marketers, and end-use customers (NERC 2006). These entities account for virtually all the electricity supplied and used in the U.S., Canada, and a portion of Baja California, Mexico (**Figure 1.1-2**).

Montana is located primarily within the western grid under the authority of the Western Electricity Coordinating Council (WECC). By design, the western grid system is weakly tied to the eastern portion of the North American system. There is currently no direct high voltage power transmission connection between Alberta and Montana (**Figure 1.1-2**).

FIGURE 1.1-2
NORTH AMERICAN
ELECTRIC RELIABILITY
COUNCIL REGIONS AND
BALANCING AUTHORITIES


NERC Regions and Balancing Authorities
NPCC
MRO
WECC
RFC
SERC
FRCC
SPP
ERCOT
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MONTANA
BCHA
AESO
SPC
MHEB
HQT
MAR
SCL
PSE
AVA
TPWR
CHPD
DOPD
BPAT
GCPD
NWMT
PGE
PACW
IPCO
WAUW
OTP
GRE
MP
NSP
UPPC
SMP
DPC
MGE
WPS
WEC
ALTE
IMO
NYISO
ISONE
MECS
WAUE
PJM
FE
SMUD
SPPC
PACE
PSCO
NEVP
WALC
WACM
LDWP
CISC
IID
AZPS
DEAA
HGMA
GRMA
SRP
TEPC
PNM
CFE
EPE
SPS
ERCO
LES
OPPD
MEC
ALTW
MPW
NPPD
KACY
INDN
MPS
WPEK
SECI
KCPL
EDE
WR
OKGE
WFEC
CSWS
GRDA
SPA
CLEC
LAFA
CILC
IP
CWLP
CWLD
AMRN
AECI
SIPC
EEI
NIPS
DEVI
IPL
HE
SIGE
LGEE
BREC
CIN
OVEC
EKPC
CPLE
CPLW
DUK
YAD
TVA
SCEG
SC
EWAY
WMUC
DENL
BCA
SEHA
SETH
SOCO
SERU
PUPP
DERS
EES
SME
AEC
LAGN
JEA
TAL
GVL
NSB
SEC
RC
TEC
FPC
FFL
FMPP
HST
Dynamically Controlled Generation
As of January 12, 2006

Source: North American Electric Reliability Council
Electric Reliability Council of Texas, Inc. (ERCOT)
Florida Reliability Coordinating Council (FRCC)
Midwest Reliability Organization (MRO)
Northeast Power Coordinating Council (NPCC)
ReliabilityFirst Corporation (RFC)
Southeastern Electric Reliability Corporation (SERC)
Southwest Power Pool, Inc. (SPP)
Western Electricity Coordinating Council (WECC)

GIS map by Ed Madej - TTEMI-HE
Fig1_1-2_MATL_NERC_Regions_020107_JA.mxd

To ensure reliable electrical transmission service, NERC authorizes "balancing authorities" in critical areas throughout the system that are responsible for maintaining load-interchange-generation balance within a balancing authority area. The WECC region contains 44 transmission operators and 35 balancing authorities (**Figure 1.1-2**). NWE and Western Area Power Administration (WAPA) are the two balancing authorities in Montana (NERC 2007). A description of the existing transmission system in Montana and Alberta, and how reliability could be affected by the Project is provided in Section 3.16.

1.2 Purpose, Benefit and Need

This section describes the purpose and benefit of the proposed action to the State of Montana as required under MEPA and MFSA (Section 1.2.1). This section also addresses purpose and need for the federal action and purpose and benefit to the applicant (Section 1.2.2) and the need for the facility (Section 1.2.3). DEQ must make several findings, including a finding of need, before a certificate can be issued under MFSA. Under MFSA, consideration must be given to the benefits of the project to the applicant and to the state.

1.2.1 Purpose and Benefit to the State of Montana

The purpose of issuing a certificate of compliance and a Presidential permit for the proposed MATL transmission line is to connect the Montana electrical transmission grid with the Alberta electrical transmission grid (no direct connection currently exists), provide access to markets for new wind generation facilities in the vicinity of the proposed transmission line, and improve transmission access to markets seeking new energy resources. Expected benefits of the proposed Project are summarized below and examined in detail in Section 3.16.

Benefits to Electricity Generators and Consumers in Montana

The proposed transmission line would have the capacity to carry up to 300 MW north and 300 MW south for a total capacity of up to 600 MW. However, due to constraints on the current system where MATL would tie in at Great Falls, the full capacity of 300 MW to the south would not be realized. The added capacity from MATL could support a modest increase in new power generation in Montana. While larger amounts of new generation would need more transmission capacity, the construction and operation of the proposed Project would provide opportunities for development of smaller energy generation projects, such as wind energy, in Montana. If the proposed transmission line is approved, MATL will have already sold most of the total capacity of the line to potential wind farms before construction begins. Information regarding energy generation companies already contracted with MATL is provided in Section 2.6.

Additional expected benefits to Montana generators and consumers include: additional connection with markets that demand energy from sustainable sources, such as electricity generated from wind power; additional wholesale electricity purchasing options for Montana utilities, which could result in lower rates due to an increase in supplier competition; and increased opportunities for western grid system optimization during high Montana export and low Alberta-BC export scenarios.

Benefits to Existing Transmission Systems

A modified transmission system, including a tie line between Montana and Alberta, may also result in benefits to transmission system operators whose service areas include Montana and to utilities that provide transmission service within the state. A modified transmission system could provide more options for power routing within Montana, increase energy transactions between Montana and Alberta, and allow for easier balancing of energy surpluses and shortages within and between balancing authority areas. Because tie lines are able to connect with adjacent electric systems, different generation resources can combine to provide a level of reliability that one jurisdiction could not otherwise afford if that jurisdiction had to cover the same resources independently. The MATL line could also create another opportunity for Montana’s largest privately owned transmission and distribution utility, NorthWestern Energy, to obtain regulating reserves for its transmission system control area.

1.2.2 Benefits as Stated by the Applicant

The MATL transmission line is a merchant line the primary purpose of which is to financially benefit the owner/operators. The MATL application for certification described the following benefits to MATL, the U.S., and Canada (MATL 2006b):

> *The Project would be the United States’ first power transmission interconnection with Alberta and is expected to facilitate development of additional sources of generation (e.g., windfarms both in northern Montana, and southern Alberta), and improve transmission system reliability in Montana, Alberta, and on a regional basis in both the U.S. and Canada. In addition, the Project would promote increased trade in electrical energy across the international border, and provide a transmission route to balance energy surplus/shortage situations in an efficient and economic manner.*

In addition, MATL asserts that system stability studies conducted under the direction of the WECC Peer Review Group indicate that the proposed Project would not adversely affect transmission system stability (Tonbridge Power, Inc. 2007).

1.2.3 Need for the Facility

The need for this line is the additional transfer capacity it would provide, if built. This line would directly connect Montana and Alberta's regional operating transmission systems, and would allow power to flow directly between these two systems where there is no current connection.

Because Montana makes more electricity than it consumes, to be economically viable, any new generation resources in Montana must offer competitive pricing and have adequate transmission access to compete in out-of-state markets or replace an existing supplier choosing to take higher profits by selling out of state (DEQ 2004). Either way, additional transmission capacity is not needed to serve Montana customers, but it is essential for the viability of new generation enterprises (DEQ 2004).

This line could support a modest increase of new electricity generators, such as wind, in the study area by connecting them to regional grids and thus potentially to electricity markets. The MATL transmission line is proposed to be capable of shipping up to 300 MW north and 300 MW south. The amount of new generation that would be able to be shipped south into Montana by MATL is currently unknown due to potential transmission constraints south of Great Falls, which is the southern terminus of MATL. To the extent that southerly electrical flows on MATL are constrained, this would reduce MATL's ability to meet the need for increased capacity. It also may result in more electricity flowing north from Montana into Alberta than from Alberta to Montana.

1.3 Scope of this Document

The objective of this DEQ EIS and DOE EA is to evaluate the construction and operation of the proposed MATL 230-kV transmission line (the Project) and two alternatives to the proposed actions of issuing a MFSA certificate of compliance and a DOE Presidential permit. The document also considers a "No Action" alternative, the impacts of not certificating or permitting the proposed facilities. The alternatives are described in Chapter 2. The environment that would be affected by the proposed Project and alternatives and an analysis of impacts to human health and the environment is provided in Chapter 3. Resource areas that are discussed in detail in this document are: land use, geology and soils, engineering, hazardous materials, water, wetlands, vegetation, wildlife, fish, air quality, noise, transportation, human health and electromagnetic fields, socioeconomics, visuals, cultural resources, and the transmission grid. This document also addresses preliminary findings necessary for transmission line certification in accordance with MFSA (Section 3.16).

This environmental document analyzes only those project-related facilities constructed inside the U.S. Neither the U.S. nor agencies of the State of Montana have jurisdiction over the regulation or permitting of facilities in Canada.

1.3.1 Alternatives Considered For Detailed Analysis

A discussion of how alternatives were developed, alternatives considered but dismissed from full analysis, and complete descriptions of the four alternatives considered for detailed analysis is provided in Chapter 2. A summary of the four alternatives is presented below.

Alternative 1 — No Action

Under Alternative 1, the proposed Project would not be approved or implemented. Existing electrical transmission service in north-central Montana would be maintained and operated at its current level. In addition, plans to construct new generation facilities, primarily wind, in the analysis area would likely not be realized.

Alternative 2 — Proposed Action

Alternative 2 is to construct and operate a merchant power line between Great Falls, Montana and Lethbridge, Alberta as described in MATL's application to DEQ (MATL 2006b) and its application for a Presidential permit before DOE. The Alternative 2 proposed alignment is 129.9 miles long and extend from the 230-kV Great Falls switch yard north of Great Falls to a proposed new substation near Cut Bank, and extend north to the Montana-Canada border at the western edge of the Red Creek Oil Field. The transmission line would be built using H-frame structures.

Alternative 3 – MATL B

Alternative 3 would be 121.6 miles long and would be similar to Alternative 2 in that the width of the right of way, pole design, types of access roads, implementation, structures, conductors, markers, substations, construction, operations, maintenance, and potential environmental protection measures would be the same as those described for Alternative 2. The Alternative 3 alignment would be different from Alternative 2 in that it would generally parallel an existing 115-kV transmission line along the entire route from the Great Falls switch yard to a substation near Cut Bank. Alternative 3 was designed by MATL based on a single preferred location MFSA siting criterion that recommends paralleling existing utility corridors (Circular MFSA-1, section 3.1). This alternative alignment was not intended to address potential land use issues or maintenance issues.

Alternative 4 – Agency-Developed

Alternative 4 was developed by DEQ within MATL's study area to address concerns raised by the public and interested agencies during the scoping period. Issues of concern that helped shape Alternative 4 are: potential adverse impacts to farmers from diagonal crossings of farm fields using H-frame structures, limitations on private property use due to crossings on private land and disturbance of visual resources. The alignment under Alternative 4 would be 139.6 miles long and would be generally constructed along field boundaries and where diagonal crossings could impact farming practices or other private land use. Public land was used when its use would be a economically practicable as the use of nearby private land. Alternative 4 also includes additional environmental protection measures recommended but not required under Alternatives 2 and 3. The use of monopoles would be required where the line would cross cropland and Conservation Reserve Program (CRP) land. The width of the right of way, project implementation, conductors, markers, substations, types of access roads, construction, operations, and maintenance would be the same as Alternatives 2 and 3.

1.3.2 Other Analyses Used In This Document

Portions of the environmental analysis were tiered from the *Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States* (BLM 2005). This document assessed the environmental, social, and economic impacts associated with wind energy development on BLM-administered land. This analysis was used to evaluate impacts on the environment that result from the incremental impact of an action alternative when added to other reasonably foreseeable future actions such as increased wind energy development projects. The Council on Environmental Quality, an office within the Executive Office of the President of the U.S., encourages agencies to use tiering as a means to eliminate repetitive discussions.

1.4 Agency Permitting Actions and Authorities

Together, DEQ and DOE are responsible for the preparation of this environmental document. DEQ administers MFSA, MEPA, the Montana Hazardous Waste Act, the Montana Water Quality Act, and the Clean Air Act of Montana. After a certificate is issued, MFSA (75-20-401[1], MCA) would preempt all other state and local laws except those pertaining to air quality, water quality, worker health and safety, noxious weed control, and instances where the state has a property right such as on state-owned land.

The location of the proposed MATL transmission line must conform to applicable state and local laws and regulations, except where the DEQ may refuse to apply any local law or regulation if it finds that the law or regulation is unreasonably restrictive in view of existing technology, of factors of cost or economics, or of the needs of consumers, whether located inside or outside the directly affected government subdivisions.

In addition to DEQ and DOE, other local, state, and federal agencies have jurisdiction over certain aspects of MATL's proposed project. **Table 1.4-1** provides a comprehensive listing of agencies and their respective permit/authorizing responsibilities with respect to the proposed project.

The initial step in the regulatory process is filing of the MFSA application, which is required by DEQ, under Title 75, Chapter 20, Montana Code Annotated (MCA). MATL submitted its MFSA application in December 2005. For DOE, the initial step was MATL's submission of its application for a Presidential permit on October 7, 2005 (70 FR 65891, November 1, 2005).

NEPA/MEPA Review

NEPA and MEPA require that decision makers consider the effects of their actions on the environment and on people before making a decision, and that state agencies inform the public of the decision making process and allow participation in the process. If DEQ and DOE determine that issuing a certificate or granting a Presidential permit would be in the public interest, the information contained in this document would provide a basis upon which those decisions are made. DEQ and DOE would use this information to decide which alternative(s) should be implemented and which mitigation measures, if any, would be appropriate for inclusion as a condition of the certificate or permit. DEQ will document its decision in a Record of Decision. For DOE, a decision, in the form of a Finding of No significant Impact would be made and could occur simultaneously with the issuance of a Presidential permit.

MFSA Certification

MFSA requires a certificate of compliance for development of this electric transmission lines. The purposes are to: (1) ensure the protection of the state's environmental resources; (2) ensure the consideration of socioeconomic impacts; (3) provide citizens with an opportunity to participate in facility siting decisions; and (4) establish a coordinated and efficient method for the processing of all authorizations required for regulated facilities (DEQ 2006). A summary of how the Project and alternatives would address each MFSA-required finding, including probable impacts, is provided in Section 3.17.

TABLE 1.4-1
PERMITS AND OTHER REQUIREMENTS FOR THE PROJECT

Permit[a]	Agency	Description	Authority
STATE			
Certificate of Compliance	**Montana Department of Environmental Quality**	Reviews project application, conducts reviews of project impacts, approves and coordinates other permit activities, and monitors project to determine compliance with terms of certificate.	Montana Major Facility Siting Act
Section 401 Certification	**Montana Department of Environmental Quality**	Provides review of potential adverse water quality impacts from discharges associated with dredged or fill materials in wetlands and other Waters of the U.S.	Montana Water Quality Act
318 Authorization	**Montana Department of Environmental Quality**	Provides for a temporary narrative water quality standard for turbidity due to construction.	Montana Water Quality Act
Land Use License (DS-432)	**Montana Department of Natural Resources and Conservation**	Licensing structures and improvements on state lands and across navigable water bodies.	Title 77, MCA
Pre-construction Authorization	**Montana Department of Natural Resources and Conservation**	Authorizes construction prior to easement grant by the Board of Land Commissioners	85-2-402 and 85-2-407, MCA
Utility Crossing Permit	**Montana Department of Transportation**	Grants utility crossing permits for transmission line and access roads that may encroach on state-owned roads.	Title 60, Chapter 6, MCA
FEDERAL			
Presidential Permit	**U.S. Department of Energy**	Permit must comply with NEPA and Electric Reliability criteria. DOE must obtain concurrence of Secretary of State and Secretary of Defense before permit can be issued.	Executive Order 12038
Section 404	**U.S. Army Corps of Engineers**	Controls discharge of dredged or fill materials in wetlands and other Waters of the U.S.	Section 404 of the Clean Water Act (33 CFR 323.1, 330)
Notice of Proposed Construction/ Alteration	**Federal Aviation Administration**	Structure location, height, lighting, and documentation relative to air traffic corridors.	49 USC 1501 13 and CFR 77, Objects Affecting Navigable Airspace

TABLE 1.4-1
PERMITS AND OTHER REQUIREMENTS FOR THE PROJECT

Permit[a]	Agency	Description	Authority
FEDERAL (Continued)			
Safety Plan	**Occupational Safety & Health Administration**	Provides guidance to on-site construction worker safety along with emergency contacts, hospital routes, etc.	29 CFR 1910
Tariff Review and Approval	**Federal Energy Regulatory Commission**	Approval of rates for transmission in interstate commerce for jurisdictional utilities, power marketers, power pools, power exchanges and independent system operators.	Title 18 CFR
Review Authority	**U.S. Department of Defense/U.S. Air Force**	Review of construction plans for power pole placement for disturbance of buried cables for Minuteman missile silos.	Consultation and concurrence
Consultation	**U.S. Department of Defense Homeland Security**	Presently required by U.S. security policy.	Consultation and concurrence
Informal Section 7 Consultation	**U.S. Fish and Wildlife Service**	Identifies any species and its habitat listed as endangered or threatened that may be impacted by the project.	Federal Endangered Species Act of 1973
Section 106 Consultation	**Montana State Historic Preservation Office**	Consultation between project applicants and federal agencies regarding impacts on cultural resources that are either listed or eligible for listing on the NRHP.	Section 110 and 106 of the National Historic Preservation Act
Rights of Way on Federal Land	**U.S. Bureau of Land Management**	Easement on federal land crossed by the project.	Federal Land Policy Management Act Subchapter V
LOCAL/COUNTY/OTHER			
Noxious Weed Management Plan	**County Weed Control Districts**	Provides containment, suppression, and eradication of noxious weeds.	Title 7, MCA
Easement Grants and Road Crossing Permits	**Boards of County Commissioners**	Consider issuance of right-of-way easement grants and road-crossing permits for county property and roadways.	County Commissioners
Line Rating	**Western Electricity Coordinating Council**	Three phases of line rating approval.	National Electricity Coordinating Council

Notes:

a	Refers to permit, notice, review authority, certificate, license, consultation or law.
CFR	Code of Federal Regulations
MCA	Montana Code Annotated
USC	United States Code

Under MFSA, the Montana Department of Transportation (MDT), Natural Resources and Conservation (DNRC), Fish, Wildlife and Parks (FWP), and Revenue, and the Public Service Commission are required to report to DEQ information related to the impact of the proposed site on each agency's area of expertise. The report may include opinions on the advisability of granting, denying, or modifying the certificate (75-20-216[6], MCA).

Presidential Permit

If DOE determines that granting a Presidential permit would be in the public interest, the information contained in this document would provide a basis upon which DOE would decide which alternative(s) should be implemented and which mitigation measures, if any, would be appropriate for inclusion as a condition of the permit. In determining whether issuance of a permit for a proposed action is in the public interest, DOE considers the environmental impacts of the propose dproject pursuant to NEPA, the project's impact on electric reliability, and any other factors that DOE may consider relevant to the public interest.

Electricity Export Authorization

Exports of electricity from the United States to a foreign country are regulated by DOE pursuant to sections 301(b) and 402(f) of the Department of Energy Organization Act (42 U.S.C. 7151(b), 7172(f)) and require authorization under section 202(e) of the Federal Power Act (FPA) (16 U.S.C.824a(e)). However, in its application to DOE for a Presidential permit MATL indicated that it intends to operate the proposed merchant transmission facilities as "open access" transmission facilities, as that term is defined by the U.S. Federal Energy Regulatory Commission, and not export electric energy to Canada on its own account. Therefore, MATL does not intend to seek an electricity export authorization. However, any other entity exporting electricity to Canada using the MATL facilities, if authorized, will require an electricity export authorization issued by DOE.

Eminent Domain

Eminent domain is the process by which the state can acquire private property for public use. The state is limited in that "just compensation to the full extent of the loss" must be paid to the property owner when exercising eminent domain (Montana Legislative Services 2005). Different property types and land uses have been identified by the legislature as appropriate public uses of eminent domain. Among these uses, power lines and their associated rights of way are included with the stipulation that rights of way are designed to be most compatible with the greatest public benefit and the least private harm (Evans 2001). Before acquiring property through the use of eminent domain, the state must prove that public interest requires taking the property based on several criteria and then proceed through the legal process (Evans 2001). It is through eminent domain that states have the power to provide transportation corridors and other infrastructure needs for their citizens.

1.5 Public Participation and Issues of Concern

The scoping process is used to identify all issues relevant to the Project as proposed by the applicant and to develop alternatives to the proposed Project. Members of the public, agencies, and the interdisciplinary team all helped to define the issues for the scope of analysis. Information related to consultation and coordination among public and government entities can be found in Chapter 5.

1.5.1 Opportunities for Public and Agency Input

DOE issued a "Notice of Intent to Prepare an Environmental Assessment and to Conduct Public Scoping Meetings and Notice of Floodplain and Wetlands Involvement; Montana Alberta Tie, Ltd." in the *Federal Register* on November 18, 2005 (70 FR 69962). In addition, DOE mailed a copy of the notice, using Montana land ownership records, to each owner of land on the MATL-proposed corridor.

DEQ and DOE hosted four public meetings in December 2005 and June 2006 at which time the public was asked to identify issues and concerns to be addressed during the review. During each meeting, MATL and DEQ representatives presented briefings. Maps and other information were available for review, and representatives from each agency were available to discuss the project, answer questions, and receive public comments.

Meeting dates and locations are listed below:

- Conrad on Monday, December 5, 2005, at Norley Hall,
- Great Falls on Tuesday, December 6, 2005, at the Great Falls Civic Center,
- Cut Bank on Wednesday, December 7, 2005, at the Glacier County Voting Center, and
- Cut Bank on Monday, June 26, 2006, at the Cut Bank Civic Center.

Additionally, throughout the scoping process, stakeholders expressed their concerns via letters, phone calls, and emails.

Other agencies having interest or responsibility in the project approval process include: FWP, Montana State Historic Preservation Office (SHPO), DNRC, U.S. Department of Agriculture (USDA) Farm Services Administration, U.S. Bureau of Land Management (BLM), and U.S. Fish and Wildlife Service (FWS).

1.5.2 Issues of Concern

Based on comments received from participating agencies and the public, ten issues and concerns were identified. These issues are briefly described below.

(1) Impacts on farming, ranching, and other land uses:

Concerns were expressed regarding potential difficulties and hindrances of farming around the transmission line structures, potential for noxious weed growth, interference with existing and future pivot or mechanical irrigation systems, and additional fencing needs. One commenter noted that when the original NWE 115-kV Great Falls to Cut Bank line was constructed in the mid-1960s, farmers on the west side of the Golden Triangle expressed concern over the H-frame structures, especially the difficulty of farming around them. With cultivation toolbars and sprayers today ranging up to 120 feet in length, an additional diagonal transmission line presents obstacles to farmers. Requests were made for evaluation of a monopole line that follows (where possible) existing roads, property or section lines, or field boundaries. Re-alignments of the proposed line could be made at turning points located on land historically used for grazing or placed in the conservation reserve program (CRP). Some stakeholders commented that the proposed line should connect to the WAPA 230-kV line at Shelby, negating the need for a new line that would cross diagonally through cropland all the way to Great Falls.

(2) Impacts on protected, threatened, endangered, and sensitive animal and plant species and their critical habitats:

Concerns were expressed about increased perch opportunities for birds of prey and resulting effects on swift fox and sharptailed grouse populations and special status wildlife. There was concern over disturbance of rare plant species that may occur within the project area. Concerns were also expressed regarding interference with migratory and feeding flight paths of waterfowl, bird strike, and potential impacts on critical wildlife habitats.

(3) Impacts on floodplains and wetlands:

Concerns were expressed about the size and degree of impacts on the mapped floodplains, wetlands, waters of the U.S., and other special aquatic sites.

(4) Avian mortality:

Concerns were expressed regarding bird mortality and suggestions were made for the use of bird strike mitigation practices currently implemented at the FWS Benton Lake National Wildlife Refuge and other applicable sites in the northern Great Plains.

(5) Impacts on cultural and historic resources:

Concerns were expressed regarding potential disturbance of Native American settlements and religious sites in the alignments.

(6) Impacts on human health and safety:

Concerns were expressed regarding specific voltage and current specifications, corona effects (including audible noise and radio and television interference), and other electromagnetic field effects from the operation of the 230-kV transmission line on human health and safety.

(7) Impacts on air, soil, and water:

Concerns were expressed regarding highly erodible soils, such as soil erosion and resultant sedimentation to surface water; mass movement and unstable geologic materials and soils; reclamation constraints; and potential increased soil erosion and impacts on existing air quality.

(8) Visual impacts:

Concerns were expressed regarding visual impacts to homes, historic homesteads, and tribal landscapes.

(9) Socioeconomic impacts:

Concerns were expressed regarding potential impacts to taxes and disturbance of residential property in Cascade, Teton, Chouteau, Pondera, Toole, and Glacier counties from the construction and operation of the line.

(10) Impact from development of wind generation projects:

Concerns were expressed regarding the potential wind energy and other electrical generation development, or limitations of that development that may be associated with the new Montana Alberta Tie 230-kV Transmission Line as “reasonable and foreseeable” development.

1.6 Definition of Terms

All technical terms, regulatory language and acronyms used in this document are defined in Chapter 7. Terms that are used to identify an area of study and common electrical power transmission units are defined as follows:

- The **facility location,** also referred to as the **alignment,** is the 500-foot-wide swath encompassing each alternative. It is defined as 250 feet from a reference centerline; however, unless otherwise stated, a pole may be placed anywhere within the alignment. The alignments for the proposed Project and alternatives are shown in maps.
- The **study area** is a 2,260-square-mile area that includes the proposed and alternative alignments and areas where roads may be built or improved. The study area was defined by MATL in its MFSA application to DEQ.
- The **safety zone** is a term limited to discussions of electric and magnetic field and is a 105-foot-wide area somewhere within the alignment for each alternative, depending on where the transmission line is placed.
- The **analysis area** is the area evaluated for each resource. Different resources have different analysis areas. Because impacts from electric and magnetic fields (EMF), for example, are generally limited to a 105-foot zone within an alignment, the analysis area is the alignment for each alternative. On the other hand, because impacts to water resources can be realized downstream from ground disturbance, the analysis area for water resources is the entire study area.
- If an alternative is selected and the line permitted, a 45-foot **right of way** would be negotiated with each land owner. It would fall within one of the alternative alignments evaluated in the environmental analysis.
- **Megawatt** (MW) is a unit used to measure the amount of electrical power transmitted through a high voltage line.
- **Kilovolt** (kV) is a unit used to measure the voltage at which a high capacity line is operated.

2.0 Description of Alternatives

2.1 Development of Alternatives

This environmental analysis evaluates the proposed MATL 230-kV transmission line (the Project) and three alternatives to the Project. MFSA requires DEQ to find that the facility as proposed, or as modified, minimizes adverse environmental impacts, considering the state of available technology and the nature and economics of the alternatives. MEPA requires DEQ to evaluate the proposed Project, reasonable alternatives to the proposed Project that would fulfill its purpose and need, and the No Action alternative. Reasonable alternatives include those that are achievable under current technology and economically feasible when compared with other similar projects. The No Action alternative reflects the status quo and serves as a benchmark against which the Project and other alternative actions can be evaluated. The No Action alternative is Alternative 1. The proposed Project is Alternative 2. Other alternatives to the proposed Project were developed based on comments and issues raised during the scoping process and include Alternatives 3 and 4, described below. Other reasonable alternatives were explored and objectively evaluated. Alternatives that were eliminated from further study are also discussed in Section 2.7.

Development of Alternatives

The development of alternatives was based on scoping comments, baseline information presented in the MATL MFSA application (MATL 2006b), technical analysis of the baseline information and issues, and the mandates of the laws, rules, and regulations administered by the agencies. MATL developed three possible transmission line alignments for the MFSA application. This environmental review analyzes two of those MFSA alignments: MATL A - the proposed Project (Alternative 2), and MATL B - an alignment generally following the NWE 115-kV transmission line from Great Falls to Cut Bank (Alternative 3). The third alignment developed by MATL (MATL C) was not analyzed in detail because it did not address scoping comments as well as other alternatives.

Issue-Driven Modifications to the Proposed Project

Issues raised during scoping are summarized in Chapter 1. DEQ developed eight local realignment segments in response to concerns about specific aspects of the proposed MATL 230-kV transmission line. These concerns focused primarily on diagonal crossings of farmed fields, land use and right-of-way issues, pole construction types and their relationship to land use issues, visual impacts, and wildlife. Local realignments are also considered as mitigating measures to resolve site specific issues.

The eight local realignment segments are described in detail in **Appendix A**. Since some of the local realignment segments overlapped, the EIS interdisciplinary team met to compare potential effects and evaluate the tradeoffs among the local realignments. The team selected five of the eight segments which were then combined with portions of Alternative 2 to make Alternative 4. This collection of segments represents a balance among resource impacts, MFSA criteria for approval listed in 75-20-301(1)(c) and (h), MCA, and the following location criteria for electric transmission lines listed in Circular MFSA-2 (section 3.1.1):

- where there is the greatest potential for general local acceptance,
- where the alignment uses or parallels existing utility and transportation corridors,
- in nonresidential areas,
- on rangeland rather than cropland,
- on non-irrigated or flood irrigated land rather than mechanically irrigated land,
- in geologically stable areas with non-erodible soils in flat or gently rolling terrain,
- in roaded areas where existing roads can be used for access to the facility during construction and maintenance,
- so that structures need not be located on a floodplain,
- where the facility would create the least visual impact,
- at a safe distance from residences and other areas of human concentration, and
- in accordance with applicable local, state, or federal management plans when public lands are crossed.

2.2 Alternative 1 — No Action

Under Alternative 1, the proposed Project would not be approved or implemented. Existing electrical transmission service in southern Alberta and north-central Montana would be maintained and operated at its current level. In addition, development of some potential wind generation resources along the proposed alignment in the Cut Bank area would likely not occur due to limitations of the current transmission system. Selection of Alternative 1 would likely preclude the construction of the proposed facility in Canada as well.

2.3 Alternative 2 — Proposed Project (MATL A)

Alternative 2 is to construct and operate a merchant power line between Great Falls and Lethbridge (the proposed Project). Alternative 2 is further defined by the alignment, right of way, pole design, access roads, construction and operation stages, and environmental protection measures included in MATL's application to DEQ (MATL 2006b) as described below. The study area for which MATL provided baseline information is shown on **Figure 1.1-1**.

Description of Alignment

The Alternative 2 alignment is 129.9 miles long in Montana and is shown on **Figure 2.3-1**. **Figure 2.3-2** shows the southern portion of the alignment in more detail, **Figure 2.3-3** shows the middle part, and **Figure 2.3-4** shows the northern part. The proposed alignment is dominated by agriculture (90.1 percent) interspersed with patches of non-farmland, mostly grasslands. Except for grazing land near the Marias and Teton rivers, and coulees and drainages, the alignment would cross mostly non-irrigated farmland and to a much lesser extent irrigated farmland.

The U.S. portion of the alignment would begin at the 230-kV Great Falls switch yard north of Great Falls. For almost 2 miles the alignment would go directly north following an existing NWE transmission line. The alignment then would turn directly west for 1 mile on FWP land, then north again, passing along the hills on FWP land on the south and west sides of the Great Falls Shooting Sports Complex. The alignment would go northeast along Highway 87, cross the highway at alignment milepost 5, and continue northwest along Black Horse Lake Flat (the south side of Black Horse Lake), then go north over dry cropland interspersed with some pasture through a low point in the bluffs above Black Horse Lake Flat. At milepost 8 the alignment would turn slightly to the west diagonally traversing the dry cropland approximately 1 mile east of Benton Lake National Wildlife Refuge. At milepost 14 the alignment would extend west for approximately 9 miles, turn north for about 5 miles, and then northwest for about 3 miles, crossing farmland and the following coulees (from south to north): headwaters of Huntley, unnamed (2), Timber, unnamed, Kinsey, and Hunt Coulee. In total, about 4 miles of State of Montana land would be crossed. The alignment would pass the west side of Teton Ridge. From the crossing of Hunt Coulee at approximately milepost 36, the alignment would traverse approximately 1 mile of rangeland to the Teton River.

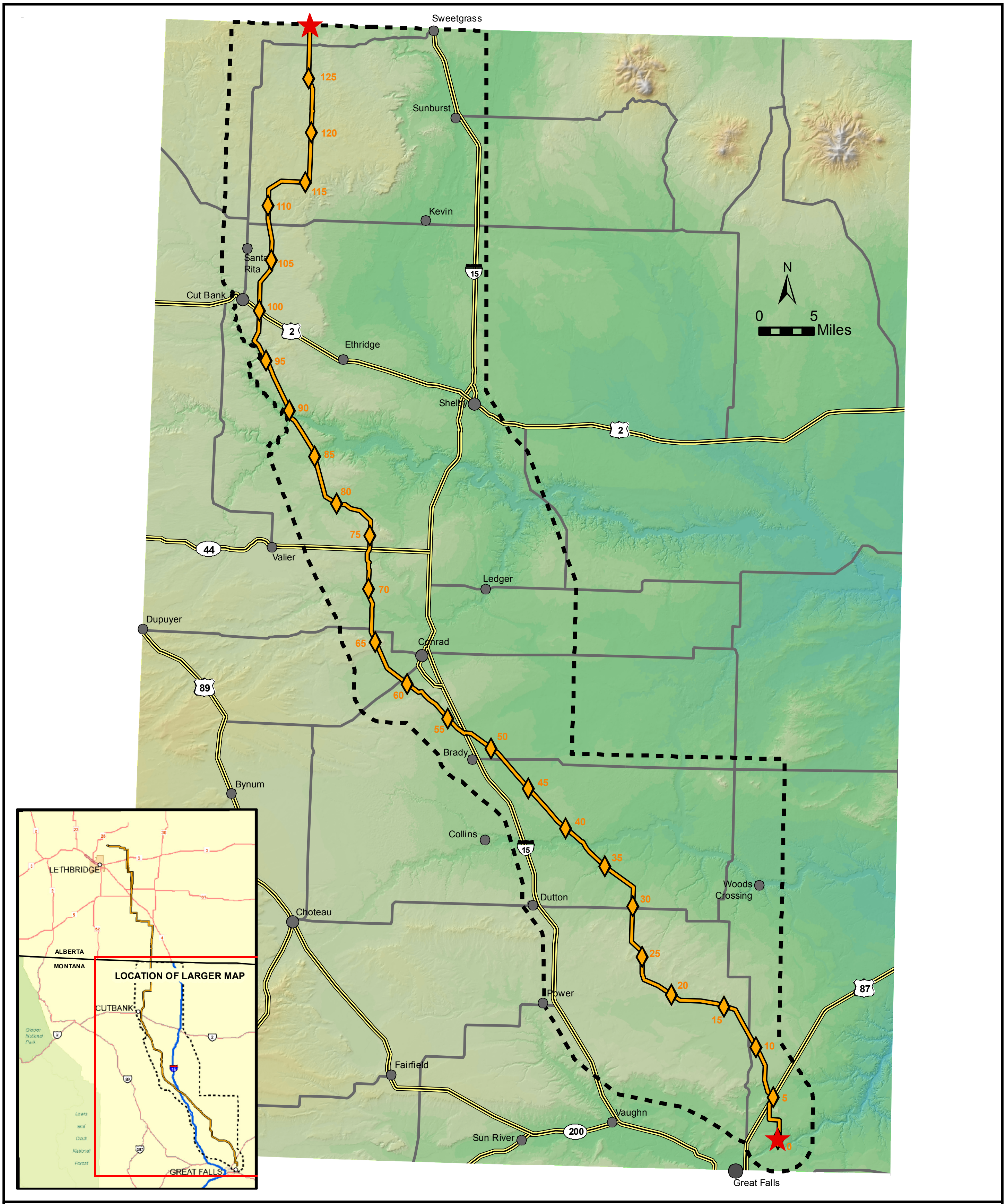

Sweetgrass
Sunburst
Kevin
Santa Rita
Cut Bank
Ethridge
Shelby
Valier
Ledger
Dupuyer
Conrad
Brady
Bynum
Collins
Choteau
Dutton
Woods Crossing
Power
Fairfield
Vaughn
Sun River
Great Falls
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
15
2
44
89
87
200
N
0 5 Miles
LETHBRIDGE
ALBERTA
MONTANA
LOCATION OF LARGER MAP
CUTBANK
GREAT FALLS

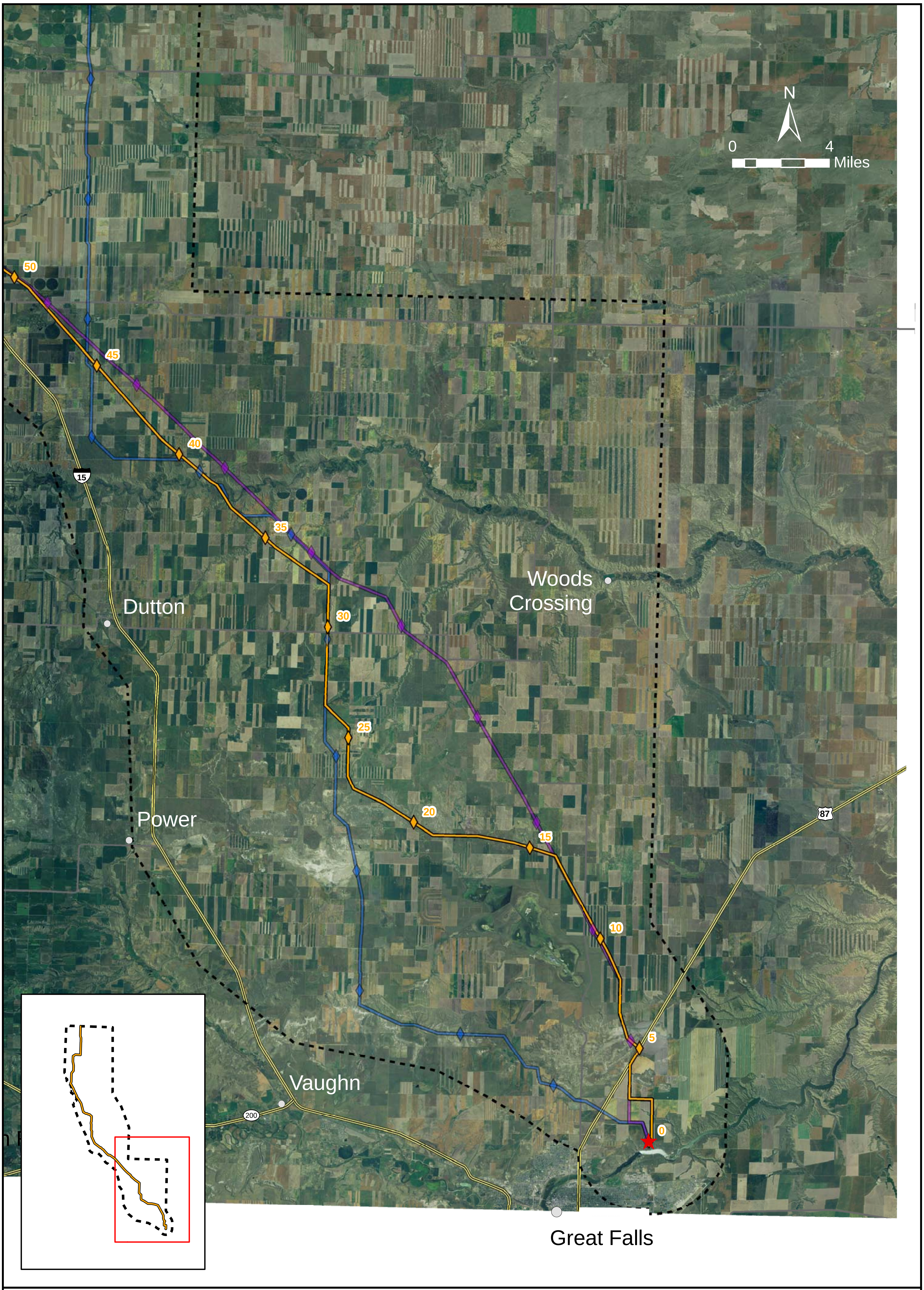
FIGURE 2.3-1
ALTERNATIVE 2 ALIGNMENT

LEGEND

- ALT2 - ALIGNMENT
- ◆ MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
- SECONDARY ROADS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_3-1_MATL_ALT2_Alignment_All_020107_JA.mxd



N
0
4
Miles
50
45
40
35
30
25
20
15
10
5
0
15
87
200
Woods Crossing
Dutton
Power
Vaughn
Great Falls

FIGURE 2.3-2
ALTERNATIVE 2 ALIGNMENT SOUTH

LEGEND

- ━ ALT 2 - ALIGNMENT
- ◆ ALT 2 MILE MARKERS
- ━ ALT 3 - ALIGNMENT
- ◆ ALT 3 MILE MARKERS
- ━ ALT 4 - ALIGNMENT
- ◆ ALT 4 MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- ┅ STUDY AREA BOUNDARY
- ═ MAJOR HIGHWAYS
- ─ SECONDARY ROADS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_3-2_MATL_ALT2_Alignment_South_020107_JA.mxd

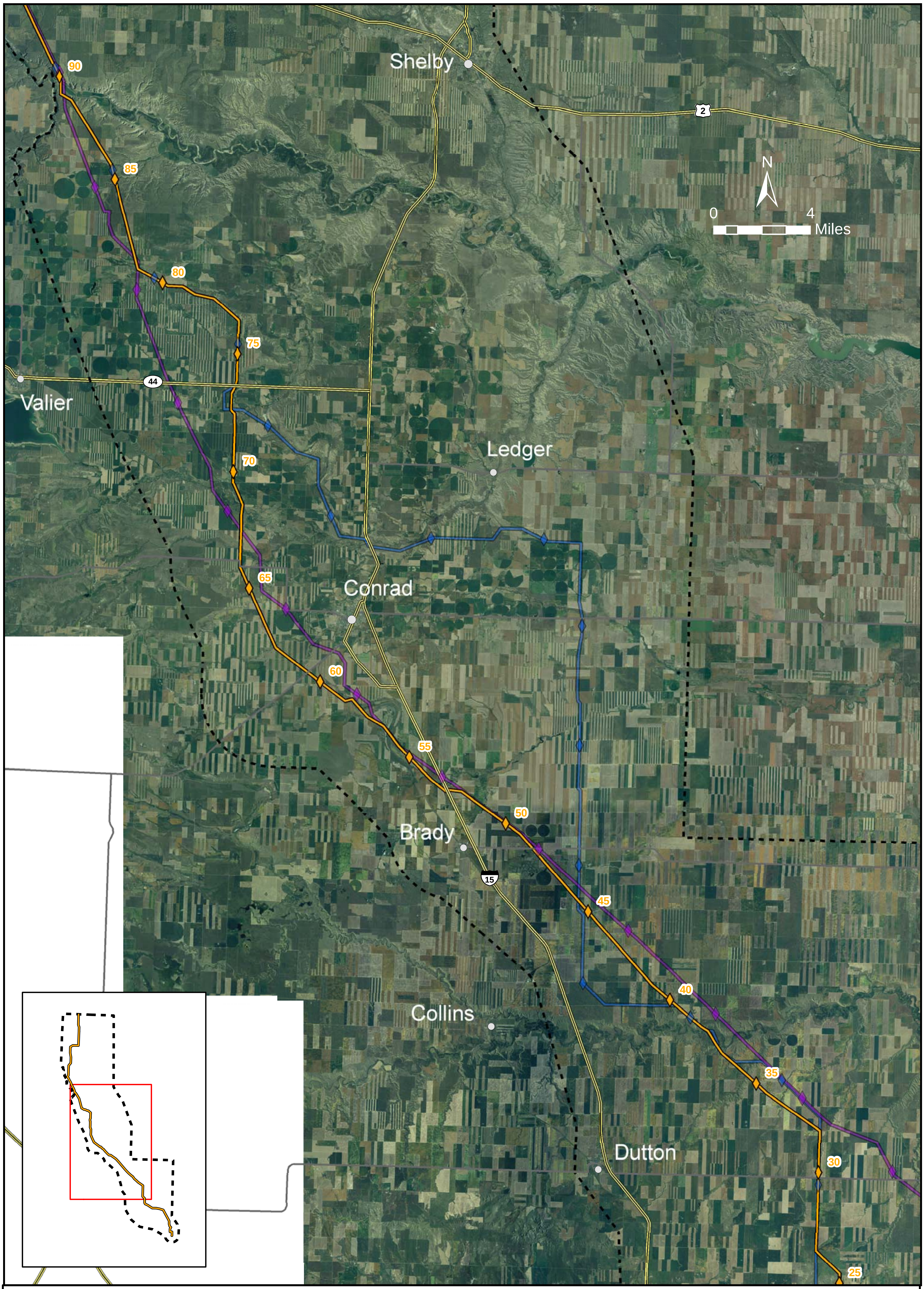

Shelby
2
N
0
4
Miles
Valier
44
Ledger
Conrad
Brady
15
Collins
Dutton
90
85
80
75
70
65
60
55
50
45
40
35
30
25

FIGURE 2.3-3 ALTERNATIVE 2 ALIGNMENT MIDDLE

LEGEND

— ALT 2 - ALIGNMENT
◆ ALT 2 MILE MARKERS
— ALT 3 - ALIGNMENT
◆ ALT 3 MILE MARKERS
— ALT 4 - ALIGNMENT
◆ ALT 4 MILE MARKERS
● CITIES AND TOWNS
★ ALIGNMENT END AND EXIT POINTS

┅ STUDY AREA BOUNDARY
═ MAJOR HIGHWAYS
— SECONDARY ROADS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_3-3_MATL_ALT2_Alignment_Middle_020107_JA.mxd

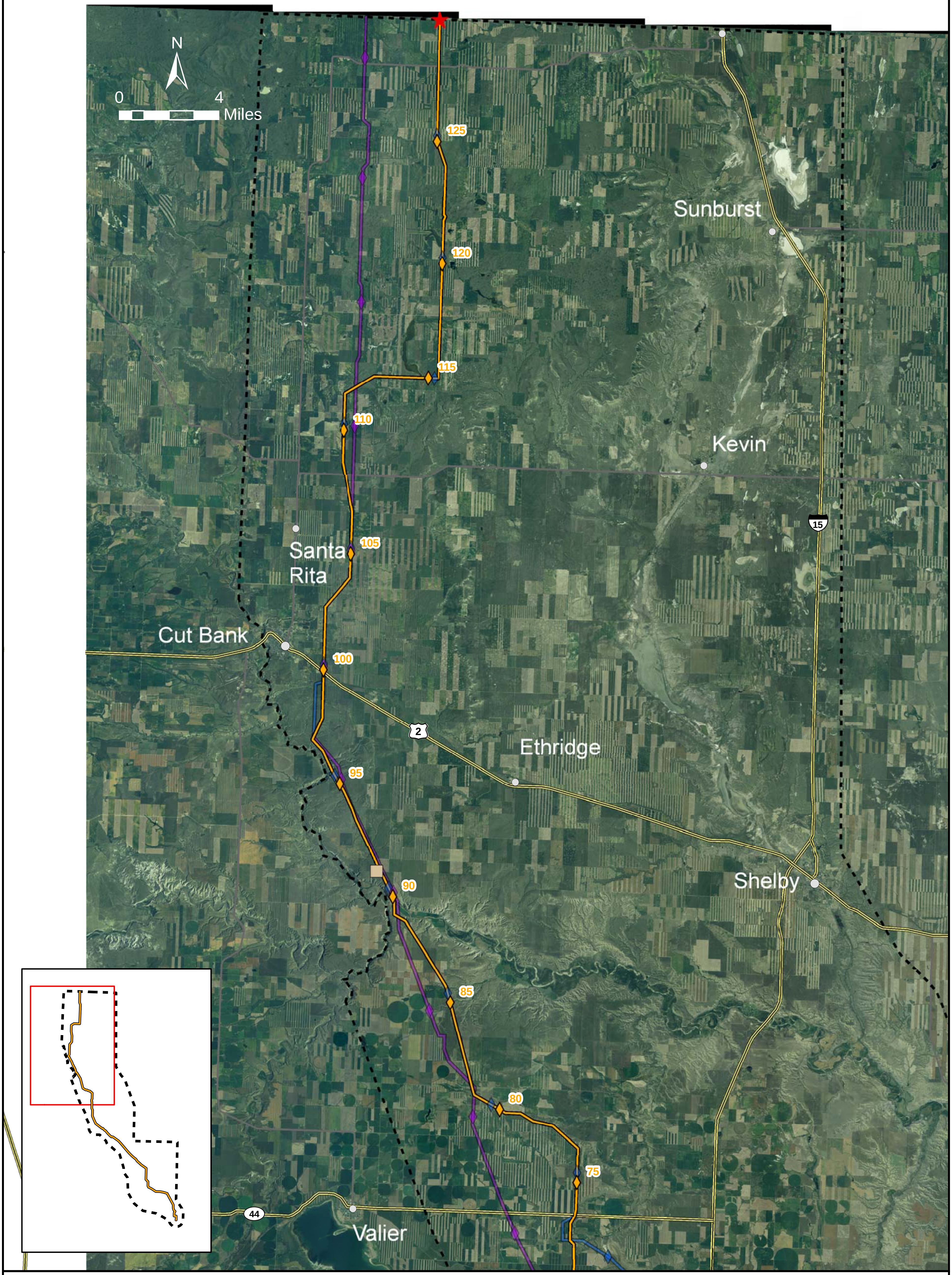

N
0
4
Miles
125
120
115
110
105
100
95
90
85
80
75
Sunburst
Kevin
15
Santa Rita
Cut Bank
2
Ethridge
Shelby
44
Valier

FIGURE 2.3-4
ALTERNATIVE 2 ALIGNMENT
NORTH

LEGEND

- ▬ ALT 2 - ALIGNMENT
- ◆ ALT 2 MILE MARKERS
- ▬ ALT 3 - ALIGNMENT
- ◆ ALT 3 MILE MARKERS
- ▬ ALT 4 - ALIGNMENT
- ◆ ALT 4 MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- ▭ STUDY AREA BOUNDARY
- ═ MAJOR HIGHWAYS
- ▬ SECONDARY ROADS
- ■ MARIAS SUBSTATION

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_3-4_MATL_ALT2_Alignment_North_020107_JA.mxd

The alignment would span the Teton River about ¼ mile east of 17th Lane, on State of Montana land in a ¼-mile-wide gap in a riparian cottonwood stand. From the river the alignment would go northwest and north across cultivated farmland until it intersects and crosses Interstate 15 about 1 ½ miles north of Brady at milepost 53. The alignment would continue northwest, crossing South Pondera Coulee and the Burlington Northern Santa Fe Railroad and Pondera Coulee, and continue northwest south of Conrad, passing approximately 3 miles west of Conrad.

At milepost 64 the alignment would then turn generally north and would cross the eastern end of the Benton Bench. North of the Benton Bench the alignment would cross farmland to the Dry Fork of the Marias River. From milepost 69 north of the river the alignment would continue north about 12 miles over cultivated farmland from Belgian Hill (just north of the Dry Fork of the Marias River) to about the mid point of Trunk Butte. At milepost 77 the alignment would pass through range and pasture land on the north side of Trunk Butte heading west-northwest toward Bullhead Creek. The alignment would follow the south side of Bullhead Creek until crossing Winginaw Coulee. The alignment then would cross Bullhead Creek approximately 3 miles east of Bullhead Lake. The alignment would then traverse farmland and around milepost 81 head northwest to Willow Rounds. The alignment would cross Abbott Coulee to the west of Willow Rounds and head north to the Marias River.

The alignment would cross the Marias River just west of the existing NWE 115-kV transmission line at milepost 90. The crossing would be approximately ½ mile east of the junction of the Two Medicine River and Cut Bank Creek on a mixture of State of Montana and BLM land. North of the Marias River the alignment would extend approximately 8 miles northwest, running roughly parallel to Cut Bank Creek to a new Marias Substation south of Cut Bank. The exact location of this substation has not been determined. The alignment would turn north and cross Highway 2 at milepost 100 approximately 1½ miles east of Cut Bank crossing rangeland in this area. From here north the alignment would cross cultivated farmland to cross Old Maids Coulee. North of Cut Bank, about 10½ miles, the alignment would turn east at milepost 112 for approximately 3 miles turning north near Hay Lake and passing the eastern side of Hay Lake. The alignment would continue north about 14½ miles from Hay Lake over mostly cultivated land to the Montana-Alberta border at a location that coincides with the proposed alignment in Canada. Along this stretch the alignment would pass the eastern edge of Grassy Lake near milepost 121. The border crossing would be at the western edge of the Red Creek Oil Field.

Rights of Way

MATL proposes an operational right-of-way width of 45 feet plus 30 feet on either side to create a 105-foot safety zone for the proposed Project based on structure type, location, proven construction methods, and safety and operations zones. Transmission line easement requirements would depend on structure widths. The 105-foot-wide zone is based on safety considerations associated with line to ground short-circuiting, and access needs for line repairs and power line maintenance activities. In some situations, the safety zones would be increased to address high wind speeds, which can cause the conductor to swing away from structures.

As discussed below under Transmission Line Structures, the Project would mostly use H-frame structures with three-pole structures used at medium and heavy angles (corners) and dead ends (see Glossary). Where the line would turn a corner, angle-bracing guy wires would be used and additional easement space would be required. Angle structures at corners generally would be subject to guy wire bracing.

MATL would coordinate with the Real Estate Management Bureau of DNRC's Trust Land Management Division for rights of way and easements across school trust lands and navigable waterways administered by the state. MATL would coordinate with the BLM Lands and Realty office to seek approval following a compatibility assessment with the West Hiline Resource Management Plan and completion of the NEPA review process. In addition to fee-owned public lands, areas covered by conservation easements including the FWS wetland easements and the Farm Service Agency's conservation reserve program (CRP) would require that MATL seek compatibility reviews by these agencies on specific parcels to ensure compliance with the terms of the easements.

During the right-of-way acquisition process, MATL would (1) coordinate with each affected landowner in order to develop final alignment and specific tower locations, (2) provide clear information about the right-of-way acquisition process, compensation, construction, and maintenance activities, and (3) understand landowner plans for use of the transmission alignment area in order to address the impact of tower and right-of-way location. MATL could exercise the right of eminent domain to obtain easements. The eminent domain process is discussed in Chapter 1.

Project Design and Implementation

MATL would design, construct, operate, and maintain the proposed transmission system in accordance with the National Electrical Safety Code (NESC), U.S. Department of Labor Occupational Safety and Health Act (OSHA) Standards, and other guidance as appropriate for safety and protection of property. The following sections describe the system components, general construction methods, and operation of the proposed transmission line.

Transmission Line Structures

Laminated wood or wood pole H-frames would be the primary support structures used. Steel structures may be used for special applications such as monopole dead-end structures. **Figure 2.3-5** illustrates the typical H-frame and monopole structures. Design characteristics of the proposed laminated or round wood-pole H-frame support structures are summarized in **Table 2.3-1.** The MFSA application says MATL may use single pole (monopole) structures where necessary to avoid conflict with center pivot irrigation systems. However, MATL has not specified where the monopole structures would be used. Characteristics of monopole support structures are summarized in **Table 2.3-1.**

MATL would use different types of H-Frame structures to address the various angles that would be necessary to accommodate changes in terrain and land use. These structures are shown in **Appendix B**. The proposed laminated or round wood-pole H-frame structures would incorporate 230-kV design standard synthetic insulators, hardware, and ground wires to provide nearly corona-free operation, as well as reduce audible noise and radio and television interference. On the typical suspension structure, three insulator strings would be hung from each structure. Each string would have 12 individual insulators.

One overhead galvanized steel ground wire, about 3/8 inch in diameter, would be installed on one side of the top of the structure for lightning protection. A second ground wire carrying a fiber optic cable for communications would be installed on the other side. At this time the fiber optic capacity of the line would only be used for MATL communications and those of MATL customers. MATL would also use the communication capacity to connect MATL facilities and those of NWE and the Alberta Electric System Operator. No plans have been made to use the excess fiber capacity for commercial purposes.

Holes would be augered into the ground to accommodate new structures. New poles are typically set in the ground 10 percent of the pole’s length plus 4 feet (that is, an 80-foot pole would be buried 12 feet). Spacing between two poles of a proposed 230-kV H-frame structure would be about 23 feet. Typical ruling span length would be about 800 feet, but could range from 500 feet to 1,600 feet. Approximately eight structures per mile would be required. Depending on terrain, total disturbance at each structure location during construction would be about 10,000 square feet. Additional design characteristics for the project are summarized in **Table 2.3-2**.

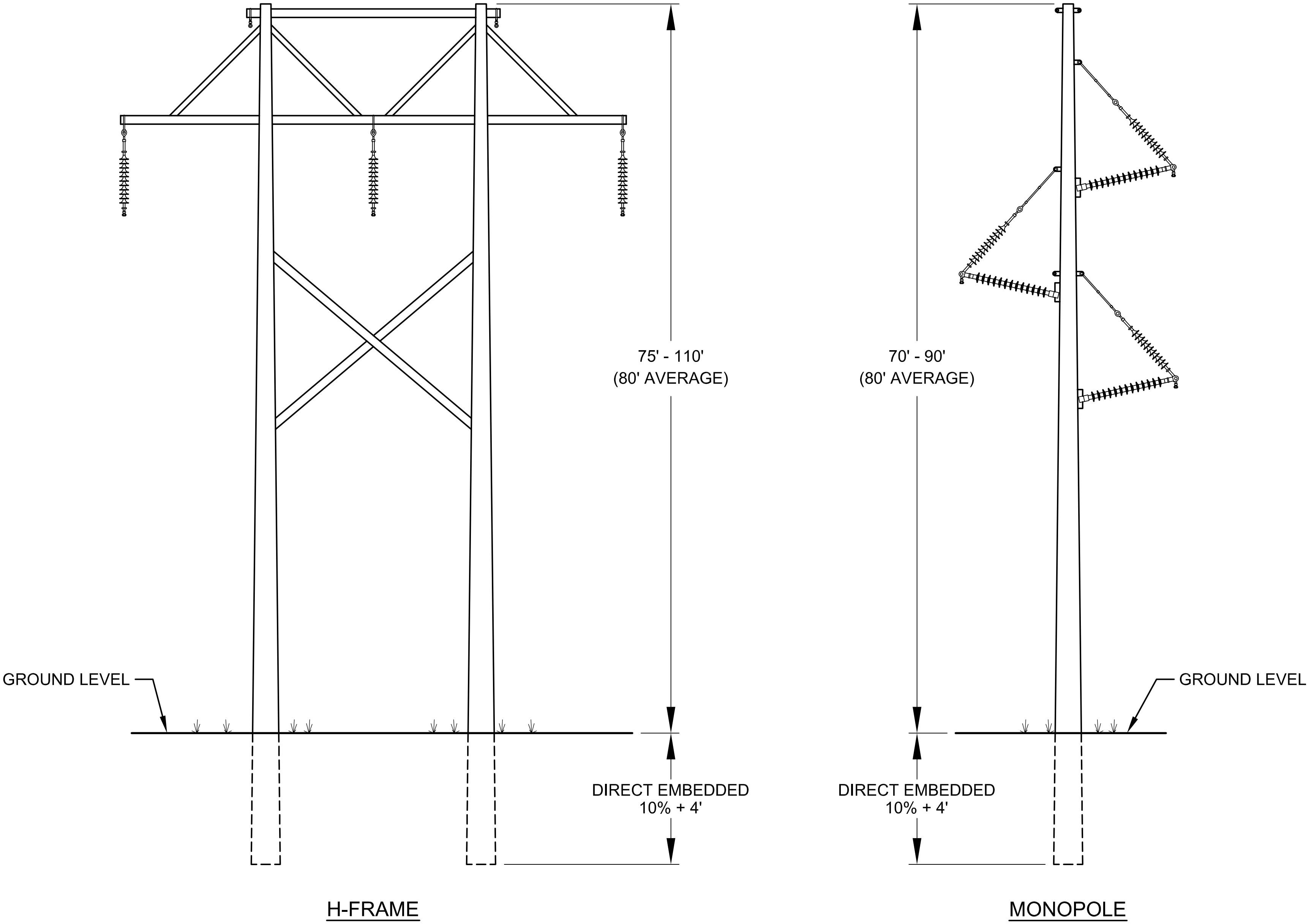

75' - 110'
(80' AVERAGE)
70' - 90'
(80' AVERAGE)
GROUND LEVEL
GROUND LEVEL
DIRECT EMBEDDED
10% + 4'
DIRECT EMBEDDED
10% + 4'
H-FRAME
MONOPOLE

FIGURE 2.3-5
PROPOSED MATL POWERLINE
TYPICAL SUPPORT STRUCTURES

TABLE 2.3-1 TYPICAL DESIGN CHARACTERISTICS		
Design Element	**H-frame**	**Monopole** [a]
Line Length within Montana	129.9 miles	Same as H-frame
Right-of-Way Width	45 feet	20 feet
Thermal Capacity for 230-kV line	625 MVA @ 212° Fahrenheit	Same as H-frame
Nominal Voltage	230,000 volts (230 kV)	Same as H-frame
Conductor Size	1590 kcmil Falcon	Same as H-frame
Conductor Type	ACSR (aluminum core steel reinforced)	Same as H-frame
Overhead Ground Wire	3/8-inch diameter galvanized	Incorporated into optical ground wire which has a diameter of no more than 0.433 inches
Electric field at edge of right of way	4.78 kV/m	3.78 kV/m
Electric field at edge of safety zone	1.61 kV/m	1.71 kV/m
Magnetic field at edge of right of way	191.46 mG	127.95 mG
Magnetic field at edge of safety zone	62.75 mG	65.62 mG
Electrostatic short-circuit current limit	5 milliampere (mA)	Same as H-frame
Structure Height Above Ground (approximate)	65 feet average	80 feet average
Length of Span (approximate)	790-foot ruling span	490-foot ruling span
Minimum Ground Clearance of Conductor	21 feet at 212°F	Same as H-frame
Typical Structure Base Dimensions	2 poles, 1 foot x 2 foot	1 pole, 1.5 foot x 2 foot
Land temporarily disturbed per site for conductor reel and pole storage yards	3,000 square feet	3,000 square feet
Area required for each structure base during operations	36 square feet	13 square feet

Notes:

ACSR	aluminum core steel reinforced	Kcmil	1,000 circular mils
kV	kilovolts	kV/m	kilovolts per meter
mA	milliampere	mG	milligauss
MVA	megavolt-amperes		

[a] On January 31, 2007, DEQ received notice from MATL indicating that two different types of monopoles could be considered. The long-span monopole design would have spans of approximately 790 feet but would require a poured concrete base and be taller than the H-frame or short-span monopole design. The short-span monopole design would have a span length of about 475 feet. MATL also indicated that to be economically feasible, the total additional costs could not exceed $850,000, or approximately 25 miles of long-span monopoles.

Structure Type	Approximate Cost (U.S. $)/per mile	Percent Increase Over H-frame
H-frame (Proposed)	$293,500	0
Monopole (Long-span)	$326,500	11.3
Monopole (Short-span)	$347,250	18.3

TABLE 2.3-2
ADDITIONAL DESIGN CHARACTERISTICS[a]

Component Description	Alternative 2	Alternative 3	Alternative 4
Line Length in Montana (miles)	129.9	121.6	139.9
H-frame	868	813	346
Monopole	0	0	588
Pulling/tensioning sites (10,000 ft^2)	22	21	24
Staging areas (2.5 acres)	2	2	2
Access road (16.8 feet wide)[a]	3 miles	5 miles	7 miles

Notes:

NA = Not applicable

ft^2 = square feet

[a] Constructed access road estimates are based on minimal need in areas of steep terrain only. Construction disturbance for a road is assumed to be 20 percent greater than the actual roadbed area.

For construction near water bodies, pole structures would not be installed below the normal high-water mark. MATL may use a helicopter for special locations such as major river crossings. If construction occurs during summer/fall months it may be possible to use a boat to string the line across water bodies. If construction occurs during the winter months, clear-span bridges could be used when a stream is dry or frozen (MATL 2006b). Small watercourses could possibly be forded if sufficiently frozen; where fording conditions are not available, other potential options include portable bridge placement or use of existing access roads. Water crossing construction would be postponed if any excessive flows or flood conditions are present or anticipated. The use of a helicopter or boat would be the construction contractor's choice unless dictated to do otherwise.

Transmission Line Conductors

Electrical conductors provide the medium for flow of electrical energy. The proposed circuit configuration and conductor size for H-frame and monopole support structures are shown in **Table 2.3-1**. The conductor consists of strands of reinforced steel cable encased by aluminum strands. The steel cable provides the tensile strength to support the conductor; the aluminum conducts most of the electrical current.

For H-frame structures, the minimum proposed ground clearance of the conductor would be 21 feet, 1.3 feet higher than the 19.72 feet, based on the NESC. MATL predicts that the EMF strengths at the edge of the right of way would be 4.78 kilovolts per meter (kV/m) and 191.46 milligauss (mG), respectively. MATL predicts that the electric and magnetic field strengths at the edge of the safety zone would be 1.61 kV/m and 62.75 mG, respectively.

Markers and Warning Devices

In order to reduce bird collisions with the ground wire, MATL would install bird strike diverters and warning devices in high risk areas such as near Hay Lake, the Marias River, Dry Fork Marias River, and Teton River crossings, east of Benton Lake National Wildlife Refuge (NWR), and high ridge crossings such as the Benton Bench northwest of Conrad. For example, the "firefly" bird flapper/diverter would alert birds to the transmission line through light, motion, and reflectivity (see Section 3.8). For daytime deterrence, this diverter uses highly reflective materials and fluorescent colors designed to be seen and avoided by birds. These markers glow in the dark for about 10 hours for night time deterrence. The "firefly" also rotates in 3- to 5-mile-per-hour wind conditions to increase visibility. MATL would explore other technology and deploy it as needed for site-specific application.

MATL would comply with appropriate regulations of the Federal Aviation Administration (FAA). MATL would install FAA-recommended colored aerial markers for aviation safety, as well as at 12 crossings of the Conoco pipeline, and one crossing of the Cenex pipeline. These ball markers are up to 36 inches in diameter (though 20-inch markers are permitted on approaches to airports below 50 feet) and are available in international orange, white, and yellow (installed with alternating colors). Reflective tape can be installed on the markers to increase their nighttime visibility for aircraft. For transmission lines above 220 kV, a special corona-free inside surface coating is recommended.

New and Upgraded Substations

MATL proposes to construct a new substation (named the Marias Substation), next to the proposed Great Plains Wind Energy McCormick Ranch wind farm. This substation would be located approximately 10 miles south of Cut Bank, but the exact location has not been determined. Alternative 2 does not include an interconnection to Glacier Electric Cooperative at the Cut Bank Substation nor to the substations south of Conrad.

MATL would estimate the EMF strengths at the property boundaries of the proposed Marias Substation to determine if there could be risks to landowners and users of the adjacent properties. The Marias Substation and the expanded 230-kV Great Falls switch yard would be located in farmland or range/pasture land and not be located in a residential or subdivided area.

North of Great Falls, across the river from Giant Springs State Park, MATL is also proposing to interconnect with the NWE 230-kV Great Falls Switch yard, requiring NWE to enlarge the switch yard to accommodate the MATL tie line and other proposed lines. MATL would submit a copy of the interconnect agreement with NWE to DEQ as an addendum to the application, if the agreement becomes valid.

Access Roads

As a result of relatively flat topography and associated agricultural land uses that predominate in the Project study area, MATL anticipates only minimum development of access roads to construct, operate, and maintain the proposed Project. The majority of the Project right of way would be easily accessed from public roads, existing two-track roads, and farm fields allowing truck and equipment travel along the right of way. MATL does not anticipate maintenance of these access points with the exception of gate installations at key locations, if necessary. MATL proposes that disturbances resulting from access requirements would be reclaimed to conditions similar to what existed pre-project or to those conditions specified by landowners during easement-lease negotiations. Obstacles to travel along the right of way would potentially include:

- Slopes greater than 5 percent forcing the contractor to construct temporary access roads,
- Coulees or intermittent stream channels,
- Flowing streams, rivers, or other wetland areas,
- Areas with highly erodible soils,
- Areas providing habitat for sensitive wildlife or plant species,
- Pipelines, railroad tracks, irrigation ditches, or other linear features, and
- Heritage or archaeological sites.

The Marias and Teton river valley crossings may pose difficult access because of rugged topography. Grading and recontouring may be required in these potentially difficult construction sites to gain access to reinforced structures that would support wire spans of these valleys. MATL would reclaim these areas in coordination with landowners and appropriate agencies. MATL expects that other specific sites would be identified and addressed in subsequent reclamation plans as system design and associated access planning proceeds.

Construction

Construction is anticipated to take 4 to 6 months to complete. **Table 2.3-3** provides a summary of construction tasks and required resources and equipment. Transmission line construction tasks would include the following:

- *Pre-Construction*: Environmental permitting, cultural resource clearance, final transmission structure siting, engineering design, land procurement, various utility studies, and major procurement.
- *Surveying:* Initial line survey work, consisting of survey control, alignment centerline location, profile surveys, and access surveys would occur before construction. Light Detection and Ranging (LIDAR) would be used to provide much of this information. LIDAR is an airborne laser mapping technology that directly measures the shape of the earth's surface under the aircraft. LIDAR generates wide-area elevation information that can be used to make models showing details such as buildings, trees, and power lines.
- *Geotechnical Survey:* Investigation at selected key locations (for example, medium and heavy angle deflection points) to establish foundation requirements.
- *Access Planning and Preparation:* Crews would gain access from public roads as well as within the transmission line right of way for constructing, operating, and maintaining the line. When possible, access to the right of way would be by existing trails and roads. Trails are generally two-track routes and are not maintained. Access for line construction would be truck travel within the right of way. Therefore, graded surface access roads are not planned. Trails would be located at right angles to streams and washes. Existing roads and trails would be left in comparable or better condition than before construction. The safety zone is designed to minimize the potential for encroachment and to ensure that if buildings are proposed near the line, the safety zone would be large enough to prevent them from encroaching near the line.

  Gates would be installed where fences cross the right of way. Locks would be installed at landowner's request. Gates not in use would be closed but not locked unless requested by the landowner.
- *Delivery and Assembly:* Framing crews deliver poles, X-braces, cross-arms, insulators, and hardware to structure sites on flatbed trucks, then assemble individual structures. During installation, poles are set directly in holes augered to a depth equal to 10 percent of the pole length, plus 4 feet. Crews would backfill holes, compact fill material to prevent structure movement or settling, and spread excess excavation material evenly over the site or transport it off site for disposal, depending on landowner requests. At heavy angled and dead-end structures, cast-in-place concrete footings would be installed. Crews would assemble structures and place hardware using man-lift trucks. Guy wires would be screwed into the ground using standard construction practices.

TABLE 2.3-3
SUMMARY OF CONSTRUCTION TASKS AND REQUIRED RESOURCES AND EQUIPMENT

Task	Crew Size	Typical Wage Level ($/hour)[a]	Equipment
Access Fencing/Reclamation	2	$15 to $18	¾ –ton post pounder
Framing	6	$17 to $20	Teleking 5-ton crane, Bobcat, 1-ton crewcab pickup
Setting	8	$17 to $20	330 Texoma digger, 35-ton setting crane, gravel truck, air compressor w/ tamper, Bobcat, (2) 1-ton crewcab pickups
Anchoring	3	$20 to $22	radial arm digger or retrofitted trench hoe
Material Handling	2	$17 to $20	(2) trucks
Pole Hauling	3	$20 to $22	pole truck, pickup
Stringing	31	$20 to $26	Tensioner, puller, 30-ton crane and pickup, soft line winder and pickup, cat pulling sock line and pickup, crane and pickup, flat deck and small crane, rider pole crew digger, pole truck

Notes:
[a] Wage levels extrapolated from "Montana Prevailing Wage Rates – Heavy Construction" Rates Effective March 10, 2006

- *Conductor Installation:* After erecting all structures, conductor and ground wires would be installed. Large reels of conductor and overhead ground wire would be delivered to pre-selected pulling and tensioning sites (about every 2 miles) along the transmission line alignment. About 10,000 to 16,000 feet of conductor and overhead ground wire would be installed for each pull. Methods used to install conductor and overhead ground wire include using a small line (p-line) attached to the conductor or ground wire to pull the cable through pulleys attached to the insulator strings. Once the conductor/ground wire is pulled the necessary length, it is tightened. Adjustments made during tensioning would prevent the cable from sagging too much (due to ambient temperature and heating caused by flow of electricity) and would comply with the NESC.
- *Restoration*: All disturbed areas associated with transmission line construction would be restored to pre-construction condition. These efforts typically include gate repair as necessary, revegetation, and waste material removal.

MATL proposes construction to commence as soon as all permits and a certificate of compliance are issued by DEQ. MATL may be completing construction activities during the late spring and summer seasons, which may coincide with agricultural activities. MATL would try to minimize and avoid impacts to planted and growing agricultural crops or compensate the landowner if impacts cannot be avoided.

Construction Staging Areas

Construction staging areas (sometimes referred to as "lay-down areas") would be located in previously disturbed areas, such as rail yards, siding areas, construction yards, and fallow lots, whenever possible. Some construction staging areas may be located on undisturbed land when disturbed sites are not available. In general, construction staging areas would be located in communities near the right of way where rail and truck service are available, or in rural areas where equipment could be unloaded from tractor-trailers. In all cases, construction staging areas would be located on private land and would be subject to landowner negotiations and agreements. Construction staging areas would likely be located near Cut Bank, Valier, Conrad, Brady, Dutton, and Great Falls. Each site would likely be between 2 and 3 acres. The combined total disturbed area associated with these sites would be approximately 15 acres.

Operations

NWE and Alberta Electric System Operator system dispatchers at power control centers would direct normal line operations, using MATL's facilities to operate circuit breakers, determine the amount of power required to serve the loads and configure the power system accordingly. Dispatchers also would schedule the proper generation amount, and monitor the power system to ensure reliable service. Circuit breakers would operate automatically to ensure safe transmission line operation. Normal farming and other activities would be permitted on transmission line rights of way, if these activities do not interfere with line operation and maintenance or create safety problems. Grid reliability is discussed in Chapter 1.

Maintenance

Maintenance programs would include routine aerial and ground patrols. Aerial patrols would be conducted annually and as needed after severe wind, ice, wild fires, or lightning storms to check for damage to conductors, insulators, or structures. Ground patrols generally would occur every 5 years to detect equipment in need of repair or replacement. When possible, ground patrols and subsequent repair activities would be scheduled to minimize crop and property damage. Noxious weed control plans (see **Appendix C MATL Noxious Weed Control Plan**) would help guide herbicide treatments. Vegetation clearing may also be required in certain areas to minimize fire hazards.

For emergencies, crews would respond promptly to repair or replace damaged equipment. MATL would meet with respective landowners to arrange compensation for any damages incurred during emergency repair operations.

Environmental Protection Measures

MATL proposes project-specific environmental protection measures, shown in **Table 2.3-4,** that may be used to avoid or reduce the intensity and/or duration of the impacts to resources. MATL proposes to implement a worker education program and on-site monitors to ensure that the mitigations are strictly followed. Other guidance MATL proposes to use includes WAPA's Construction Standard 13 (WAPA 2001) and Raptor-Safe Power Line Construction Practices (Edison Electric Institute [EEI] and Avian Power Line Interaction Committee [APLIC] 1996). Applicable standards from Standard 13 that MATL would adopt include:

- *Landscape Preservation (Section 13.3):* Includes guidance to preserving landscape features, constructing and restoring construction roads, and constructing and restoring construction facilities, such as offices and storage yards.

- *Preservation of Cultural Resources (Section 13.4):* Provides requirements for treatment and notification of known or discovered cultural sites or artifacts.

- *Noxious Weed Control (Section 13.5):* Requires a "clean vehicle policy" while entering and leaving construction areas to prevent transport of noxious weed plants and/or seed.

- *Disposal of Waste Material (Section 13.8):* Requires removing and disposing of all waste material generated during construction.

- *Pollutant Spill Prevention, Notification, and Cleanup (Section 13.10):* Requires measures to prevent spills of pollutants and appropriate response if a spill occurs. Includes any solvent, fuel, oil, paint, pesticide, engine coolant, or similar substances.

- *Prevention of Air Pollution (Section 13.13):* Ensures that construction activities and equipment operation reduce air pollutant emissions, and that nuisance dust is controlled.

TABLE 2.3-4
MATL PROPOSED
ENVIRONMENTAL PROTECTION MEASURES

Environmental Protection Measures and Monitoring	Intended Effectiveness	Locations (if known)	Timing
General			
Construction personnel would be instructed on the location and identification of sensitive resources within or adjacent to the project right of way, as well as regulations pertaining to the protection of cultural and ecological resources.	Would help prevent damage to sensitive and/or protected resources.	Throughout Project area. Sensitive areas would be identified further during design phase.	Prior to construction
Erosion Control			
Erosion Control Plan identifying locations and specifications of measures to minimize erosion and sedimentation.	Re-establish vegetation and implement physical barriers to minimize soil movement on exposed slopes.	See MATL's draft Reclamation & Revegetation Plan in **Appendix D**. As the design phase continues, a SWPPP would be prepared as part of the MPDES permit.	Pre-construction
Construction contractor would implement erosion control measures (for example, water bars, drainage contours, straw bales, filter cloth, or similar). All off-site vegetative materials would be certified "weed free."	Implemented in areas with steep slopes to minimize soil movement.	See **Appendix D**. As the design phase continues, a SWPPP would be prepared as part of the MPDES permit.	During construction
Access			
Access would be limited to existing roads or two-track utility corridor, unless not feasible for transport of equipment/material.	Avoidance of new permanent vehicular access and long-term ground disturbance.	Potentially the Marias River and Teton River crossings may require some new access. This would be finalized and identified by milepost during design phase.	During construction
General engineering design plans would be developed for unforeseen temporary use areas.	Disturbance minimization and/or protection of natural resources.	Throughout Project area – This would be finalized and identified by milepost during design phase.	Pre- and during construction
All construction vehicle movement or temporary use areas outside the right of way would be coordinated with the authorizing agency and restricted to pre-designated access, contractor acquired access, or existing roads.	By limiting access to the project area, unnecessary impacts to soils and vegetation would be avoided or minimized.	Throughout Project area – This would be finalized and identified by milepost during design phase.	During construction

TABLE 2.3-4 (Continued)
MATL PROPOSED
ENVIRONMENTAL PROTECTION MEASURES

Environmental Protection Measures and Monitoring	Intended Effectiveness	Locations (if known)	Timing
At sites with soils that are sensitive to compaction, construction would be done with low bearing-pressure vehicles or compacted soil would be rehabilitated after construction by discing, plowing, or other means.	Weight limiting/distributing to reduce soil compaction and ground cover damage.	Croplands throughout Project area	During/post construction
Access road widening would be restricted unless essential for project implementation.	Minimizes damage to soils and vegetation.	Throughout Project area	During construction
Construction would be planned to avoid periods of intense farming (for example, grain harvest), as applicable.	Avoid impacting farming practices as well as crop damage compensation.	Croplands throughout Project area.	During construction
Fences, gates, and cattle guards would be repaired or replaced to their original condition if damaged during construction.	Replacement or repair as an effective resolution to property damage.	Cropland and range land as required throughout Project area.	Post-construction
MATL would work with the MDT in the design and construction of structures along or crossing any highway right of way.	Minimizes traffic disruption.	MDT maintained roads	Pre-construction
Existing roads would be properly maintained, and grading may be necessary.	Maintenance of proper drainage.	Throughout Project area	During and post construction
Access not required for operation/maintenance would be closed using the most effective method with landowner concurrence.	Prevention of permanent motorized vehicle use and resulting disturbance to soil/vegetation.	Throughout Project area	Post-construction
During project final design, structures and associated disturbances would be located to avoid or minimize impacts to known sensitive features such as water courses, residences, or cultural resource sites.	Avoid/minimize impact to sensitive features.	To be identified by milepost during final project design	Pre-construction
All construction vehicles would be restricted to the certificated construction right of way, associated facilities, and permitted access roads.	Avoid/minimize environmental impact	Throughout Project area	During construction

TABLE 2.3-4 (Continued)
MATL PROPOSED
ENVIRONMENTAL PROTECTION MEASURES

Environmental Protection Measures and Monitoring	Intended Effectiveness	Locations (if known)	Timing
Surface Water and Wetlands			
Locations for new structures would be selected to avoid 100-year floodplain encroachment where practicable.	Avoidance would prevent potential disturbance within 100-year floodplains.	Marias River, Teton River, and Old Maids Coulee crossings	Pre-/during construction
MATL would prepare an erosion control plan, whereby measures, locations of measures, and specification for measures would be used to minimize erosion and sedimentation. As a part of this a SWPPP would be submitted to DEQ.	Effective erosion control planning to reduce erosion.	See **Appendix D**. As the design phase continues, a SWPPP would be prepared as part of the MPDES permit.	Pre-construction
Unavoidable wetland impacts would require permits from U.S. Army Corps of Engineers to comply with Section 404 of the Clean Water Act.	Mitigate unavoidable impacts to wetlands and other waters of the U.S.	See **Appendix E** for a description of drainages and wetland areas that would be avoided, if possible. Any unavoidable areas would be identified by milepost during the final design phase.	During design and construction
If work in a 100-year floodplain is unavoidable, DNRC and county floodplain administrators would be consulted during the design phase and, if required, appropriate permit(s) would be obtained and implemented.	Permit stipulations would avoid or mitigate potential disturbance within floodplains.	Marias River, Old Maids Coulee, and Teton River crossings	Pre-/during construction
Wherever possible, placement of new structures and associated construction activities would occur out of wetland boundaries.	Avoidance of impacts to wetlands and other waters of the U.S.	See **Appendix E** for a description of wetland areas that would be avoided if possible. Any unavoidable areas would be identified by milepost during the final design phase.	Pre-/during construction
Reclamation & Revegetation			
Disturbed areas would be reclaimed by appropriate contouring and replanting with an approved seed mix. All seed mixtures would be certified "weed free."	Re-establishing desirable vegetation cover on disturbed sites to prevent soil loss and weed infestation.	Throughout Project area. Also see MATL's draft Noxious and Invasive Weed Plan and draft Reclamation and Revegetation Plan (**Appendices C** and **D**).	Post-construction

TABLE 2.3-4 (Continued)
MATL PROPOSED
ENVIRONMENTAL PROTECTION MEASURES

Environmental Protection Measures and Monitoring	Intended Effectiveness	Locations (if known)	Timing
Tree removal would be kept to a minimum. If feasible, equipment should go around wooded areas.	Avoiding or selectively cutting trees would protect limited forested habitats. Avoidance is preferred.	No forested areas have specifically been identified to date. Also see MATL's draft Reclamation and Revegetation Plan (**Appendix D**)	During construction
Noxious weeds would be controlled through implementation of noxious weed control plans approved by appropriate county agencies.	These efforts would reduce or eliminate introduction and spread of invasive, noxious plants.	Throughout Project area. Also see MATL's draft Noxious and Invasive Weed Plan and draft Reclamation and Revegetation Plan (**Appendices C** and **D**).	Pre-/during construction
Disturbed areas would be reclaimed to pre-construction condition or landowner requests as site work is completed.	Reduce or eliminate erosion, and weed invasion.	Throughout Project area. Also see MATL's draft Reclamation and Revegetation Plan (**Appendix D**).	During/post construction
Any reseeding would be done with an approved seed mixture.	Reduce or eliminate spread or invasion of noxious weeds.	Throughout project area. Also see MATL's draft Reclamation and Revegetation Plan (**Appendix D**).	Post construction
If necessary, vehicle wash stations would be located at appropriate locations and would be used to minimize the spread of noxious weeds along the right of way. All construction equipment would be thoroughly washed prior to first use on the Project.	Cleaning would remove mud, dirt, and plant parts from undercarriages, tires, grills, radiators etc. This would reduce potential of spreading noxious weeds.	Need and location of vehicle wash stations would be determined during final design stage.	During construction
All fill mixture brought into construction areas would be free of noxious weeds.	Borrow site should be inspected to minimize movement of noxious weeds.	Throughout Project area. Also see MATL's draft Reclamation and Revegetation Plan (**Appendix D**).	During construction
Health & Safety			
All on-site servicing or refueling of construction equipment would be performed using protective spill containment or absorption mats.	To prevent spills of pollutants, such as fuels and lubricants.	Throughout Project area	During construction
Storage of oil fluids or petroleum products on site would be prohibited. All petroleum products would be removed to a disposal facility authorized for disposal.	Reduces chances of spills and ensures proper storage and disposal of fuels and lubricants.	Throughout Project area	During construction

TABLE 2.3-4 (Continued)
MATL PROPOSED
ENVIRONMENTAL PROTECTION MEASURES

Environmental Protection Measures and Monitoring	Intended Effectiveness	Locations (if known)	Timing
All construction debris and trash would be contained and removed on a daily basis.	Daily containment and removal would prevent accumulation and windblown trash.	Throughout Project area	During construction
Traffic management and control of local roadways would be considered during construction.	Avoid unnecessary impacts to local traffic patterns.	State highway crossings and all county highway crossings. County crossings would be identified by milepost during final design and encroachment permits would be obtained, as required, from local county offices.	During construction
Human Health & Environment			
MATL would address individual complaints concerning radio and television interference as needed.	Alleviate individual impacts to radio and television users in vicinity of line.	As required, throughout Project area.	Pre/post-construction
Design would incorporate reduction or elimination of induced current and voltages.	Eliminate impacts associated with proximity and electric shock.	Throughout Project area	Pre-construction
Design and construction would be such to reduce electromagnetic field to the extent feasible.	Reduce potential for EMF effects.	Throughout Project area	Pre-construction
Land Use			
Construction would be planned to avoid periods of intense farming (for example, grain harvest) as applicable.	Avoid crop damage or compensate for damage.	Croplands throughout Project area.	Pre-/during construction
Fences, gates, and cattle guards would be repaired or replaced to their original condition if damaged during construction.	Resolution of potential property damage through replacement or repair.	Throughout Project area	Post-construction
MATL would secure encroachment permits from the MDT and counties for the design and construction of structures along or crossing any highway right of way.	Minimize impacts and safety concerns in the vicinity of roads and highways.	Final location of crossings would be determined during final design stage.	Pre-construction

TABLE 2.3-4 (Continued)
MATL PROPOSED
ENVIRONMENTAL PROTECTION MEASURES

Environmental Protection Measures and Monitoring	Intended Effectiveness	Locations (if known)	Timing
Cultural			
A project map would be provided to the contractor identifying all sensitive areas relative to the selected alternative. Prepare unanticipated discoveries plan.	Contractor awareness and mitigation implementation (notification and/or avoidance).	To be identified once cultural resources inventory and study are completed.	Pre-construction
Archeological monitors (including tribal) would be used when working in the vicinity of archeological sites.	Would monitor and work closely with MATL and contractor to ensure application of mitigation/avoidance measures.	The need for this would be assessed once the cultural resources inventory and study are completed.	During construction
Selective pole placement would be used to avoid impacts to cultural resource sites.	Cultural resource site protection.	To be identified once cultural resources inventory and study are completed.	Pre-construction
Access roads through cultural resource sites would be prohibited.	Cultural resource site protection.	To be identified once cultural resources inventory and study are completed.	Pre-construction
If any buried antiquities or remains are discovered, the contractor would notify DEQ and SHPO prior to continuing work.	Would allow for proper treatment of any undiscovered sites.	Unknown	During construction
Visual			
Structures would be placed to avoid or span visually sensitive features whenever possible.	Reduce potential visual quality impacts.	To be identified once visual resources analysis is completed during the EIS.	Pre-/during construction
No paint or permanent discoloring agents would be applied to rocks or vegetation. All flagging would be removed upon completion of the project.	Reduce potential visual quality impacts.	Throughout Project area.	Pre-/during construction
Wildlife			
Raptor safe power line construction practices (Edison Electric Institute, Avian Power Line Interaction Committee) would be employed during transmission line construction.	To reduce risk of electrocution to perching raptors.	Throughout Project area, as needed (Benton Lake NWR, and others).	Pre-/during construction
Approved line marking devices would be installed at appropriate intervals and appropriately staggered on each overhead ground wire across stream crossing and migratory bird flyways (for example, wetland crossings) within the right of way.	Minimization of potential bird strikes at stream crossings and other high use areas.	Installed at water body and drainage crossings and at wetland areas identified in **Appendix E**. This would be finalized during final design.	Pre-/during construction

TABLE 2.3-4 (Continued)
MATL PROPOSED
ENVIRONMENTAL PROTECTION MEASURES

Environmental Protection Measures and Monitoring	Intended Effectiveness	Locations (if known)	Timing
MATL would consult with FWP concerning construction activities (for example, timing) near sharp-tailed grouse leks.	Timing restrictions on construction near sharp-tailed grouse leks would reduce potential disturbance to grouse.	Leks were identified within 1 mile of the Marias River crossing and would be addressed.	Pre-/during construction
Air Quality			
Water would be sprayed on areas that are producing excessive airborne dust in proximity of residences and communities and as needed to ensure safety during construction.	Dust suppression during dry periods or near populated areas.	Throughout Project area, as required to address dry conditions during construction.	During construction

Notes:

DNRC	Department of Natural Resources and Conservation
EMF	Electric and magnetic field
EIS	Environmental Impact Statement
FWP	Montana Fish, Wildlife, and Parks
MATL	Montana Alberta Tie Line
MDT	Montana Department of Transportation
MPDES	Montana Pollutant Discharge Elimination System
NWR	National Wildlife Refuge
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan

Site-specific locations where these measures would be used would be finalized during the final design phase and would be identified by project milepost location when that information becomes available. Final mitigation measures required to address those site-specific measures (and all other finalized plans) would be submitted to DEQ before construction begins. In addition, MATL would work with DEQ to identify the extent of environmental monitoring that would be needed during and after construction.

DEQ would apply environmental specifications to the proposed Project (**Appendix F**). DEQ's draft Environmental Specifications identify general environmental protection measures and sensitive areas for site-specific specifications.

2.4 Alternative 3 — MATL B

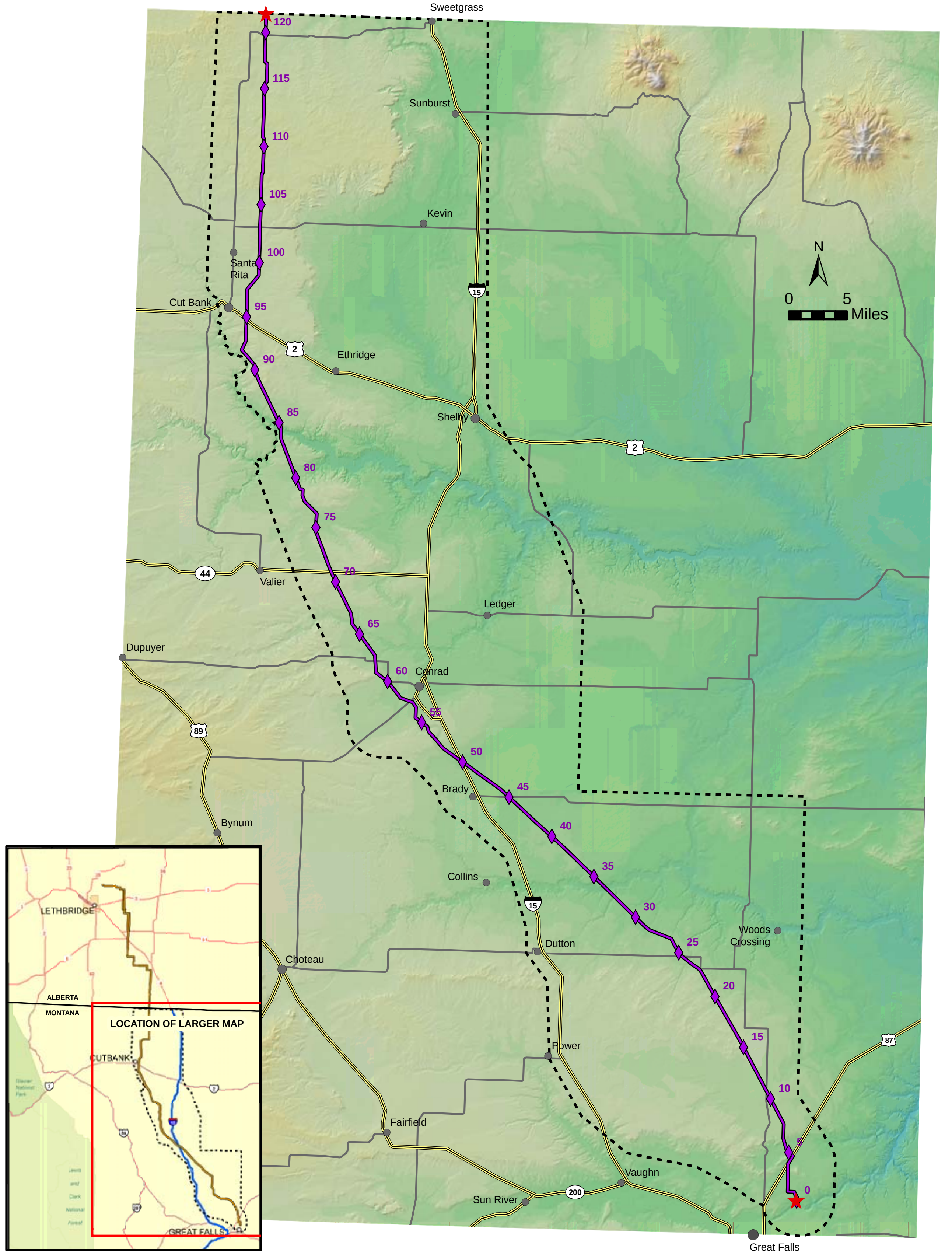
Alternative 3 would generally parallel the NWE southeast to northwest trending 115-kV line along its entire distance from the line's tie-in to NWE's 230-kV switch yard north of Great Falls to a substation by Cut Bank.

This alternative is described in the MATL MFSA application as Alternative MATL B (MATL 2006b). Alternative 3 was designed based on a single criterion listed in 75-20-301(1) MCA, with specific intent to utilize or parallel the existing NWE 115-kV transmission line corridor. This alternative alignment was initially considered by MATL as its preferred option, but it was later modified. This alternative is not intended to address potential land use issues or maintenance issues but is the shortest and potentially the least costly alternative under consideration.

Description of Alignment

The alignment for Alternative 3 would be 121.6 miles long (**Figure 2.4-1**). The south part of the alignment is shown in detail on **Figure 2.4-2**. The middle part is shown on **Figure 2.4-3**, and the north part is shown on **Figure 2.4-4**. The alignment would follow Alternative 2 heading north from Great Falls. Alternative 3 would diverge from Alternative 2 near the Great Falls Shooting Sports Complex (at about milepost 1), continuing north along the eastern side of the complex where Alternative 2 would change direction to the west, then north. Alternative 3 would rejoin the Alternative 2 alignment north of the complex at approximately milepost 2, generally following the NWE 115-kV power line. Alternative 3 would diverge from Alternative 2 again around milepost 13 where Alternative 2 crosses 8th Road, at approximately milepost 14. Alternative 3 would continue in a northwesterly direction, following the 115-kV power line, on the east side of Teton Ridge, while Alternative 2 would turn west then north. Alternative 3 and Alternative 2 would come close to each other and parallel each other (but not join) at approximately milepost 32 of Alternative 2 in the headwaters of Kinnerly Coulee. Alternative 3 generally would parallel Alternative 2, mostly to the east of Alternative 2, from milepost 32 to approximately milepost 70 north of Conrad. The alignment would cross Sheep, Rye, Timber, unnamed, Kinley, and Hunt coulees.

The Teton River crossing would be approximately 1 mile west of Kerr Bridge (20th lane) in an area approximately 100 yards east of a mature riparian cottonwood stand. Alternative 3 would cross Pondera Coulee east of Alternative 2 then generally continue northwest across the tip of the Teton bench while Alternative 2 would head north to its crossing of the Dry Fork of the Marias River. Alternative 3 would cross the Dry Fork of the Marias River about 1½ miles northwest of the Alternative 2 crossing to rejoin Alternative 2 at approximately mile 83 by Bullhead Creek. Alternative 3 diverges from the NWE 115-kV line about 1½ miles south of Bullhead Creek, going north to cross Bullhead Creek at the same location as Alternative 2. Alternative 3 then rejoins the NWE 115-kV line to continue northwest with some minor differences.


Sweetgrass
Sunburst
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Dutton
Woods Crossing
Power
Fairfield
Vaughn
Sun River
Great Falls
120
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LETHBRIDGE
ALBERTA
MONTANA
LOCATION OF LARGER MAP
CUTBANK
GREAT FALLS

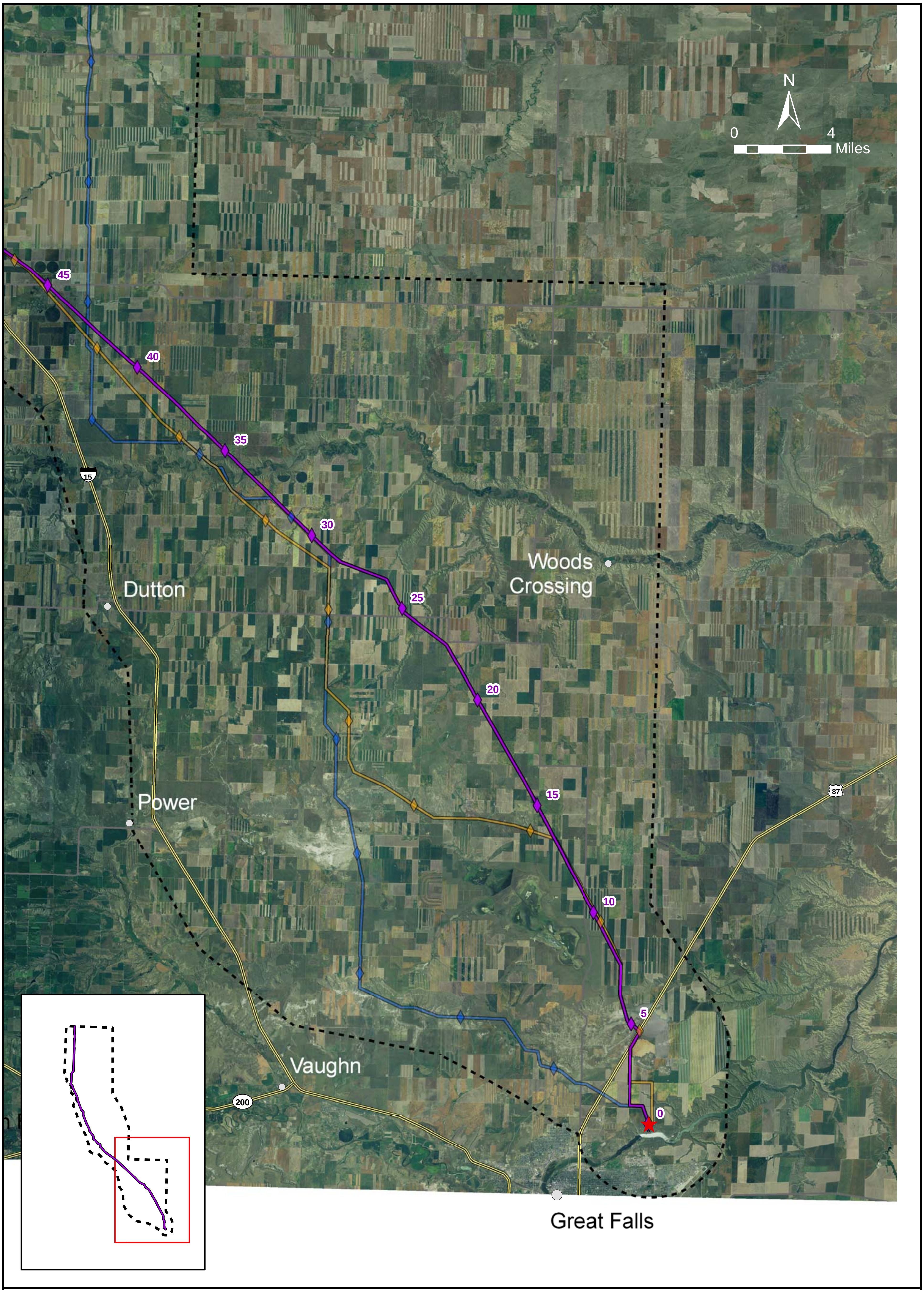
FIGURE 2.4-1
ALTERNATIVE 3 ALIGNMENT
(MATL B)

LEGEND

- ALT3 - ALIGNMENT
- ◆ MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
- SECONDARY ROADS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_4-1_MATL_ALT3_Alignment All_020107_JA.mxd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87
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Woods Crossing
Dutton
Power
Vaughn
Great Falls

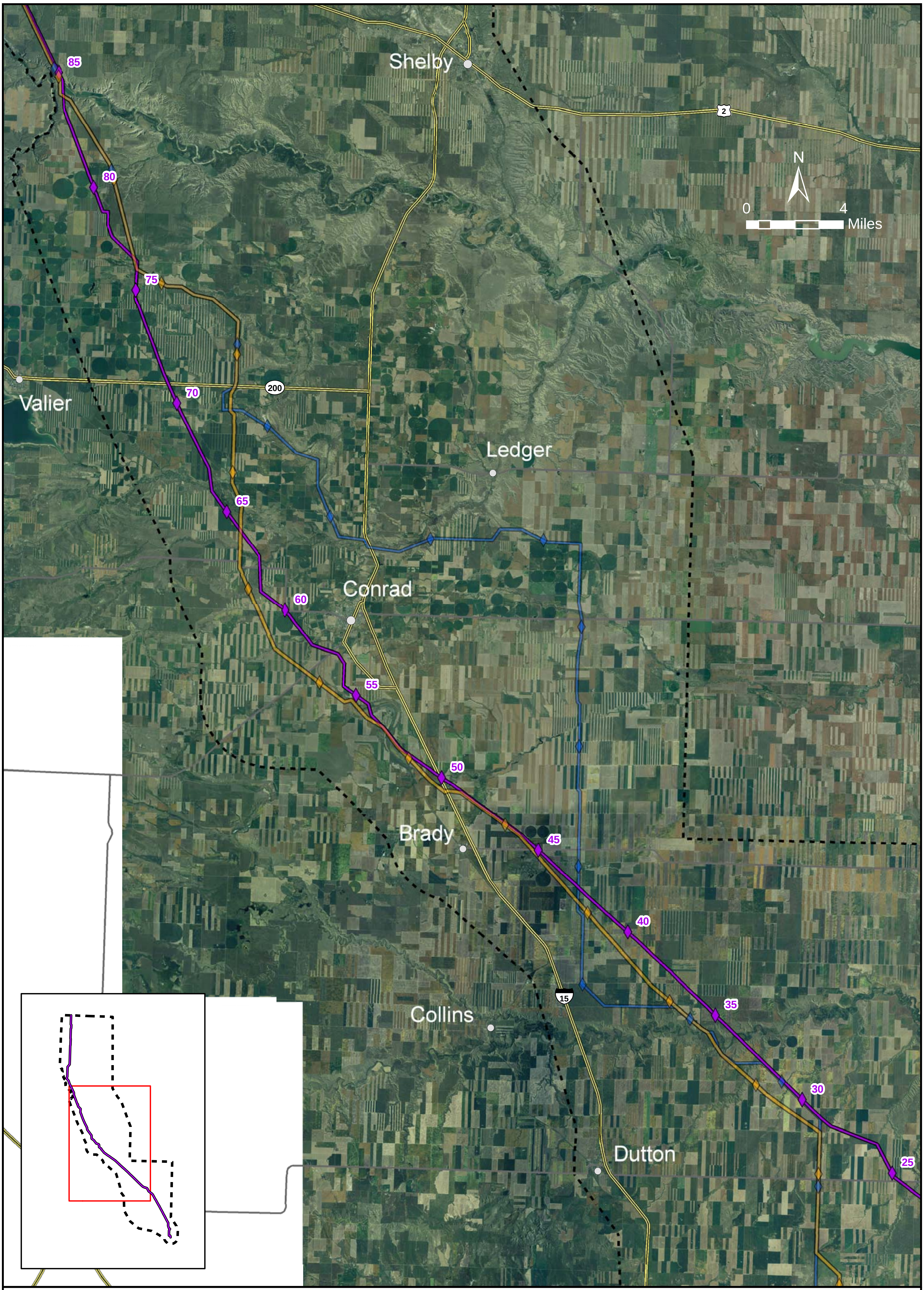
FIGURE 2.4-2
ALTERNATIVE 3 ALIGNMENT SOUTH

LEGEND

- ALT 3 - ALIGNMENT
- ◆ ALT 3 MILE MARKERS
- ALT 2 - ALIGNMENT
- ◆ ALT 2 MILE MARKERS
- ALT 4 - ALIGNMENT
- ◆ ALT 4 MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
- SECONDARY ROADS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_4-2_MATL_ALT3_Alignment_South_020107_JA.mxd


Shelby
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Valier
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Ledger
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Conrad
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Brady
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15
35
Collins
30
Dutton
25

FIGURE 2.4-3
ALTERNATIVE 3 ALIGNMENT
MIDDLE

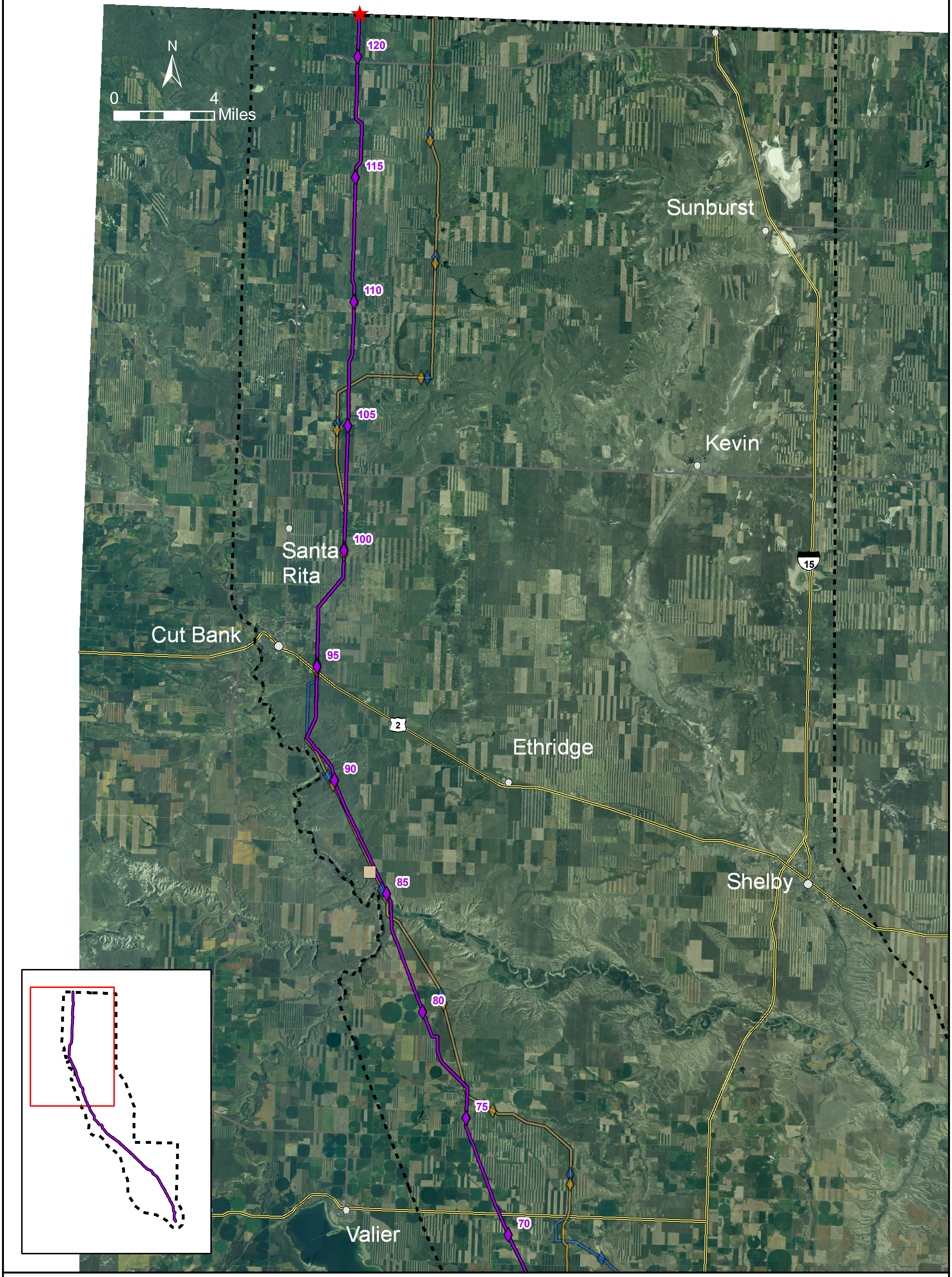
LEGEND

- ALT 3 - ALIGNMENT
- ALT 3 MILE MARKERS
- ALT 2 - ALIGNMENT
- ALT 2 MILE MARKERS
- ALT 4 - ALIGNMENT
- ALT 4 MILE MARKERS
- CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS

- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
- SECONDARY ROADS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_4-3_MATL_ALT3_Alignment_Middle_020107_JA.mxd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Sunburst
Kevin
Santa Rita
Cut Bank
Ethridge
Shelby
Valier
15
2

FIGURE 2.4-4
ALTERNATIVE 3 ALIGNMENT
NORTH

LEGEND

ALT 3 - ALIGNMENT
ALT 3 MILE MARKERS
ALT 2 - ALIGNMENT
ALT 2 MILE MARKERS
ALT 4 - ALIGNMENT
ALT 4 MILE MARKERS
CITIES AND TOWNS
ALIGNMENT END AND EXIT POINTS
STUDY AREA BOUNDARY
MAJOR HIGHWAYS
SECONDARY ROADS
MARIAS SUBSTATION

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_4-4_MATL_ALT3_Alignment_North_020107_JA.mxd

Under Alternative 3, the crossing of the Marias River would be just to the east of the Alternative 2 crossing. From here to Cut Bank, the alignment for Alternative 3 would parallel and overlie Alternative 2. Alternative 3 would diverge notably from Alternative 2 north of Santa Rita, at approximately milepost 115. From this location, Alternative 3 would continue in a northerly direction, while Alternative 2 would turn east before heading north. The border crossing for Alternative 3 would be approximately 4 miles west of the border crossing for Alternative 2. **Table 2.3-2** describes additional design characteristics for Alternative 3.

Except as specified in this section, the following aspects of Alternative 3 would be the same as described under Alternative 2: alignment, rights of way, design, implementation, structures, conductors, markers, substations, access roads, construction, operations, maintenance, and potential environmental protection measures listed in **Table 2.3-4**.

DEQ would apply environmental specifications to the proposed Project (**Appendix F**). DEQ's draft Environmental Specifications identify general environmental protection measures and sensitive areas for site-specific specifications.

2.5 Alternative 4 – Agency Alternative

Alternative 4 was developed by DEQ to address public concerns over the proposed line regarding interference with farming activities and close proximity to residences. It would use portions of Alternative 2 from north of Conrad to the Montana-Alberta border. When developing Alternative 4, DEQ located the alignment to maximize the use of range and pasture land, where it was available. Where cultivated land would be crossed, the alternative was generally located along north-south and east-west field or strip boundaries, as suggested by public comment. Where the alternative does not run north-south or east-west, it would be mostly located on range and pasture land, where interference with farming would be reduced. Public land would be used when it would be reasonably available, but most land in the study area is privately owned.

DEQ also attempted to maintain a buffer around residences to reduce visual impacts and help alleviate concerns about potential health effects. However, in order to maximize the use of field and strip boundaries, the alternative would be located within ¼ mile of several residences.

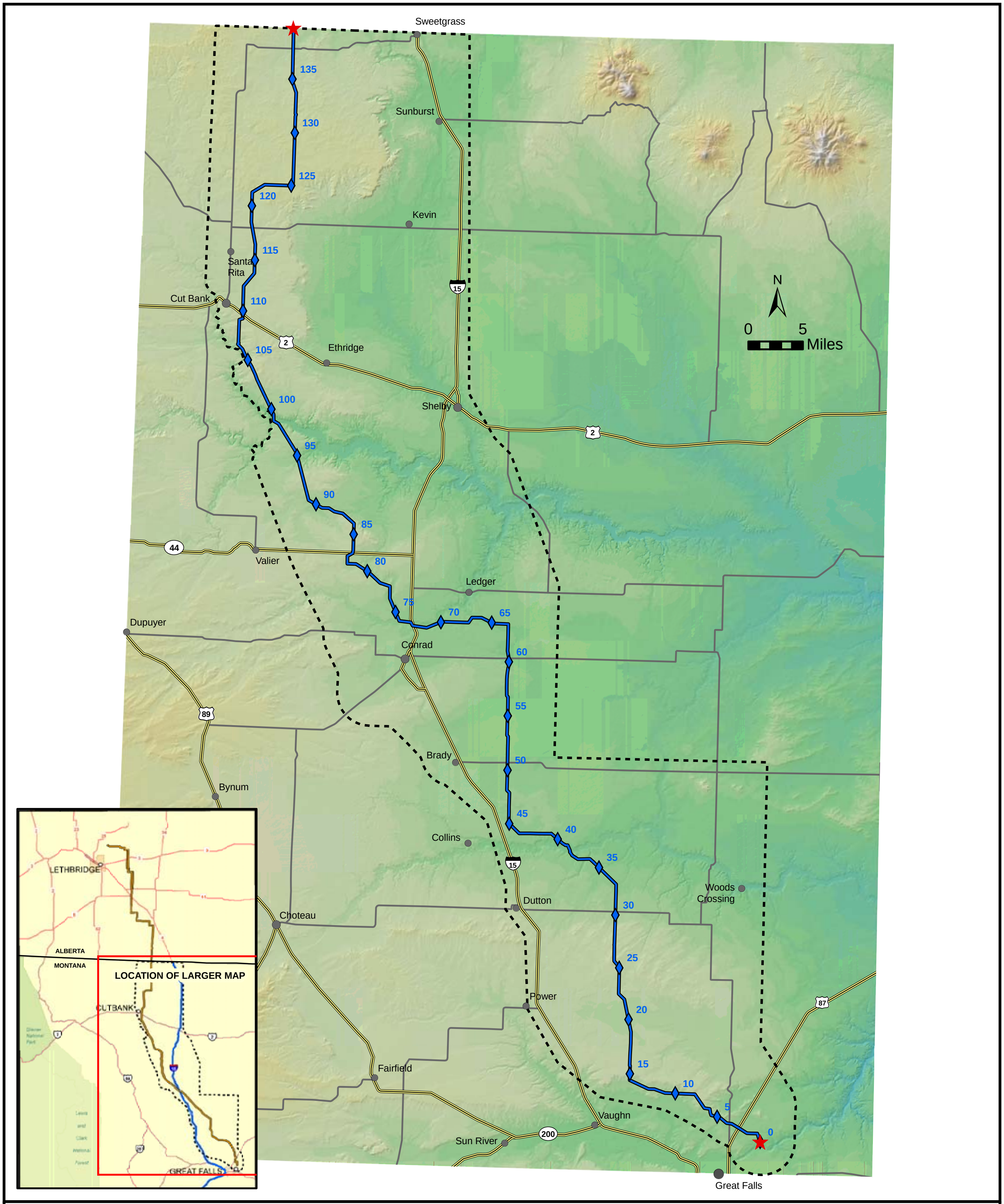
Specific line location suggestions by individual landowners were incorporated into Alternative 4 south of Highway 2, south of Highway 44, south of the Teton River in the Diamond Valley area, and north of the Great Falls 230-kV switch yard. Alternative 4 would parallel WAPA's 230-kV single pole Great Falls to Conrad line where that line is located mostly on range and pasture land. In response to extensive public comment, this alternative incorporates a single pole design where cropland and land enrolled in CRP would be crossed.

DEQ identified other possible local realignments to address the specific issues raised during the scoping meetings. After initial analysis, only 5 of the local realignments were assembled into this Alternative 4. All of the local realignments, including those retained in Alternative 4, are outlined in detail in Section 2.7, alternatives considered but dismissed. DEQ's initial analysis of the local realignments is presented in **Appendix A**. Although Alternative 4 is analyzed as a whole, the DEQ director may select only some of the local realignments or other realignments that have been reviewed but not included in this alternative.

Except as specified in this section, the following aspects of Alternative 4 would be the same as described under Alternative 2: rights of way, design, implementation, structures, conductors, markers, substations, access roads, construction, operations, maintenance, and environmental protection measures listed in **Table 2.3-4**. Alternative 4 would require the use of monopole structures on cropland and CRP land.

Alternative 4 would be 139.6 miles long in Montana and is shown on **Figure 2.5-1**. **Figures 2.5-2, 2.5-3,** and **2.5-4** show the alignment in more detail. MATL has indicated that because Alternative 4 is longer than the other alternatives, and because the use of monopoles may require more poles per mile, this alternative would be more expensive than alternatives 2 and 3. MATL estimates that the direct effect of Alternative 4 would be to result in a 12 month delay and a $7 million increase in direct costs (Tonbridge Power, Inc. 2007). MATL has stated that if DEQ selects this alternative, the project would be unlikely to be built.

The alignment would diverge from the southern 23 miles of Alternative 2, to avoid diagonal crossing of farm land, where possible (**Figure 2.5-2**). Where Alternative 2 would go directly north out of the Great Falls switch yard, Alternative 4 would take a west-northwesterly path out of Great Falls paralleling the railroad and the WAPA 230-kV Great Falls to Conrad transmission line, making use of an existing transportation corridor. The alignment would head west and then north along the railroad and rejoin the Alternative 2 alignment where it leaves 8th Road around milepost 27. This alignment would run south and west of Benton Lake National Wildlife Refuge. In the headwaters of Kinnerly Coulee, just south of the Teton River, the alignment would run directly north at milepost 32 where Alternative 2 turns northwest. Where the Alternative 4 alignment intersects the NWE 115-kV transmission line, it would parallel the line for approximately 3 miles until it would turn west to join the Alternative 2 alignment at milepost 37 just south of the Teton River. The Alternative 4 alignment would then cross the Teton River just east of the location described in Alternative 2. The alignment would rejoin the Alternative 2 alignment after crossing the Teton River.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Vaughn
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Sun River
Great Falls
LETHBRIDGE
ALBERTA
MONTANA
LOCATION OF LARGER MAP
CUTBANK
GREAT FALLS

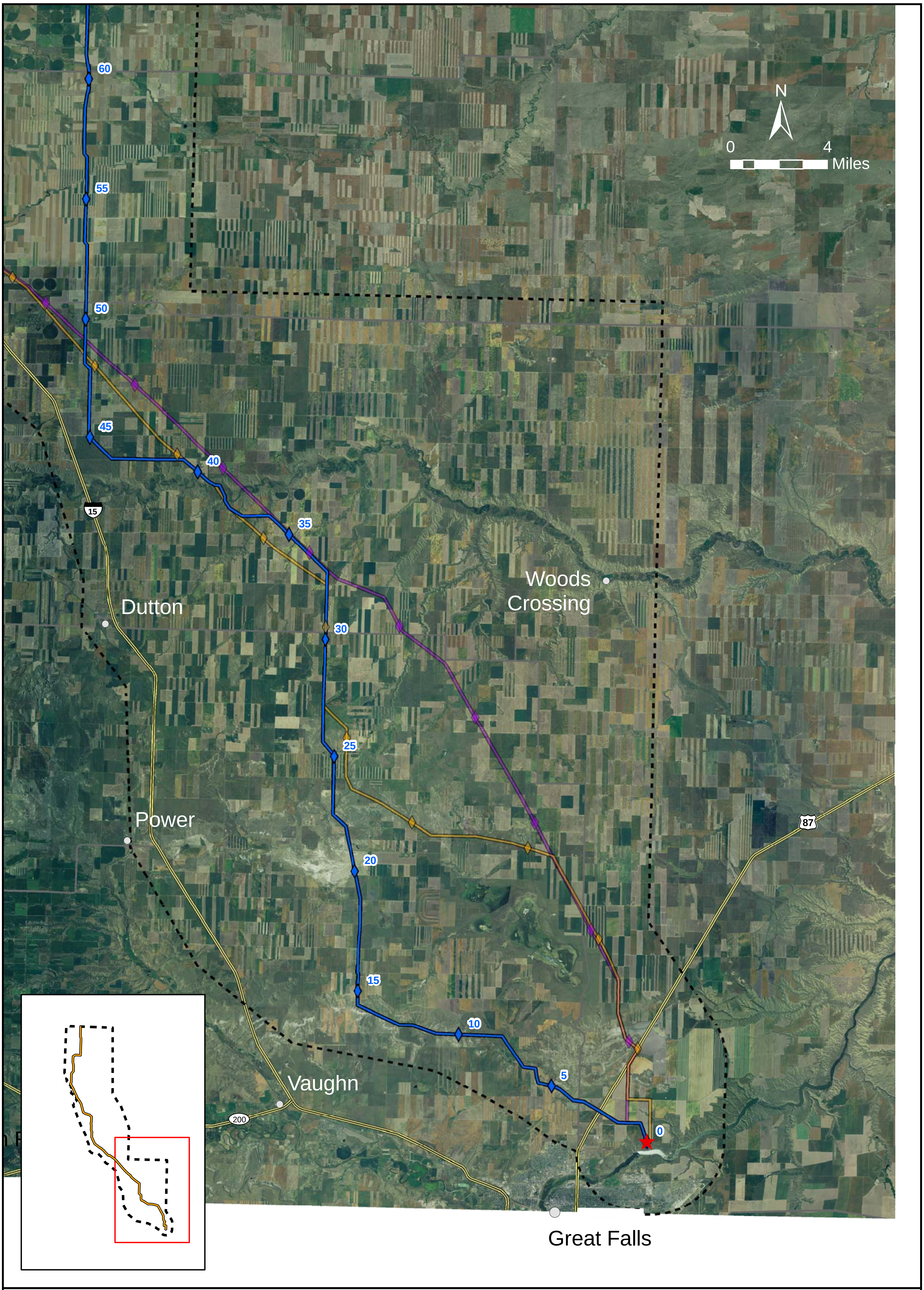
FIGURE 2.5-1
ALTERNATIVE 4 ALIGNMENT

LEGEND

- ALT4 - ALIGNMENT
- ♦ MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
- SECONDARY ROADS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_5-1_MATL_ALT4_Alignment All_020107_JA.mxd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Vaughn
200
Great Falls

FIGURE 2.5-2
ALTERNATIVE 4 ALIGNMENT SOUTH

LEGEND

- ALT 4 - ALIGNMENT
- ◆ ALT 4 MILE MARKERS
- ALT 2 - ALIGNMENT
- ◆ ALT 2 MILE MARKERS
- ALT 3 - ALIGNMENT
- ◆ ALT 3 MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
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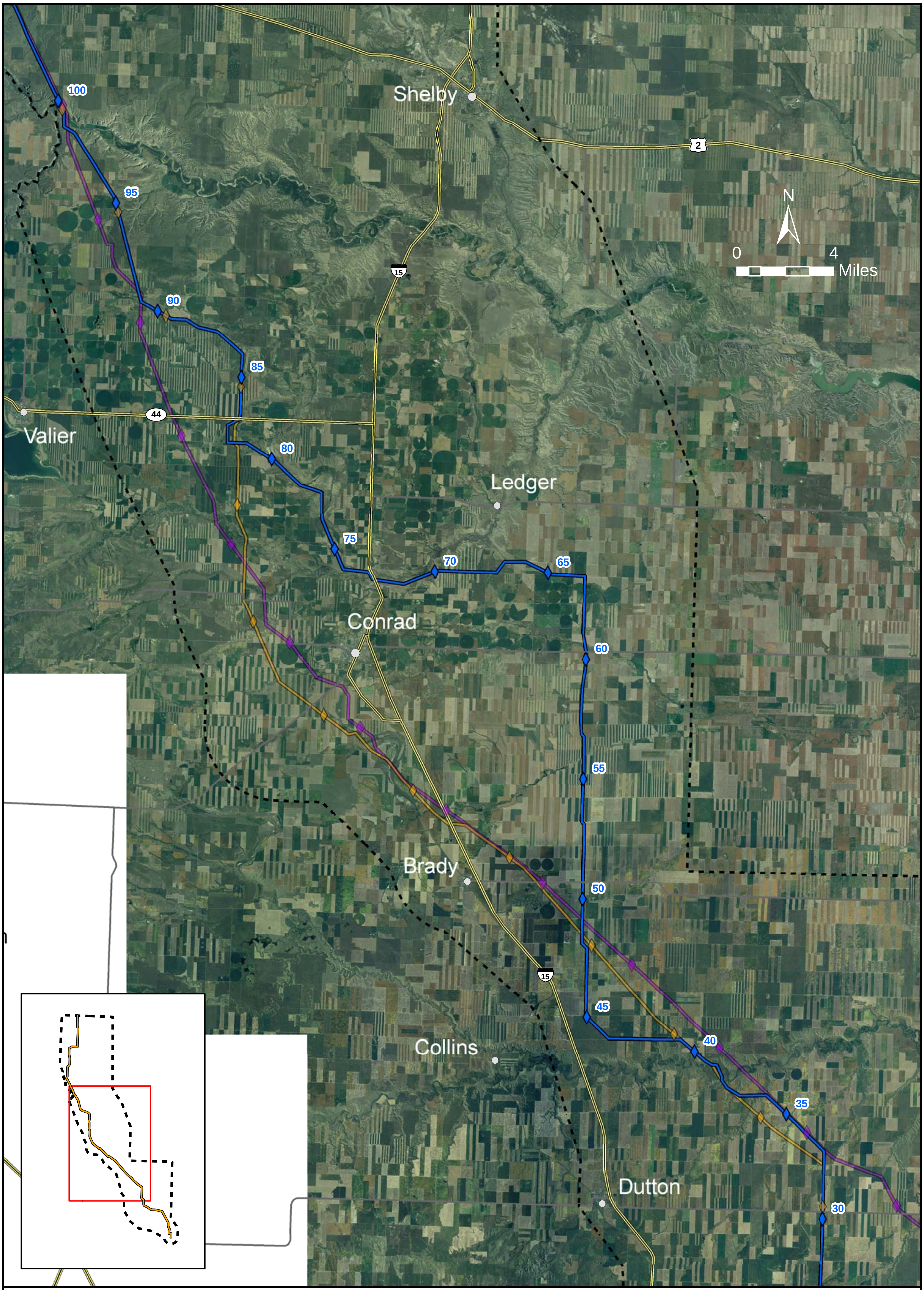
GIS map by Ed Madej -TTEMI-HE Fig2_5-2_MATL_ALT4_Alignment_South_020107_JA.mxd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Ledger
Conrad
Brady
Collins
Dutton
15

FIGURE 2.5-3
ALTERNATIVE 4 ALIGNMENT
MIDDLE

LEGEND

- ALT 4 - ALIGNMENT
- ◆ ALT 4 MILE MARKERS
- ALT 2 - ALIGNMENT
- ◆ ALT 2 MILE MARKERS
- ALT 3 - ALIGNMENT
- ◆ ALT 3 MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
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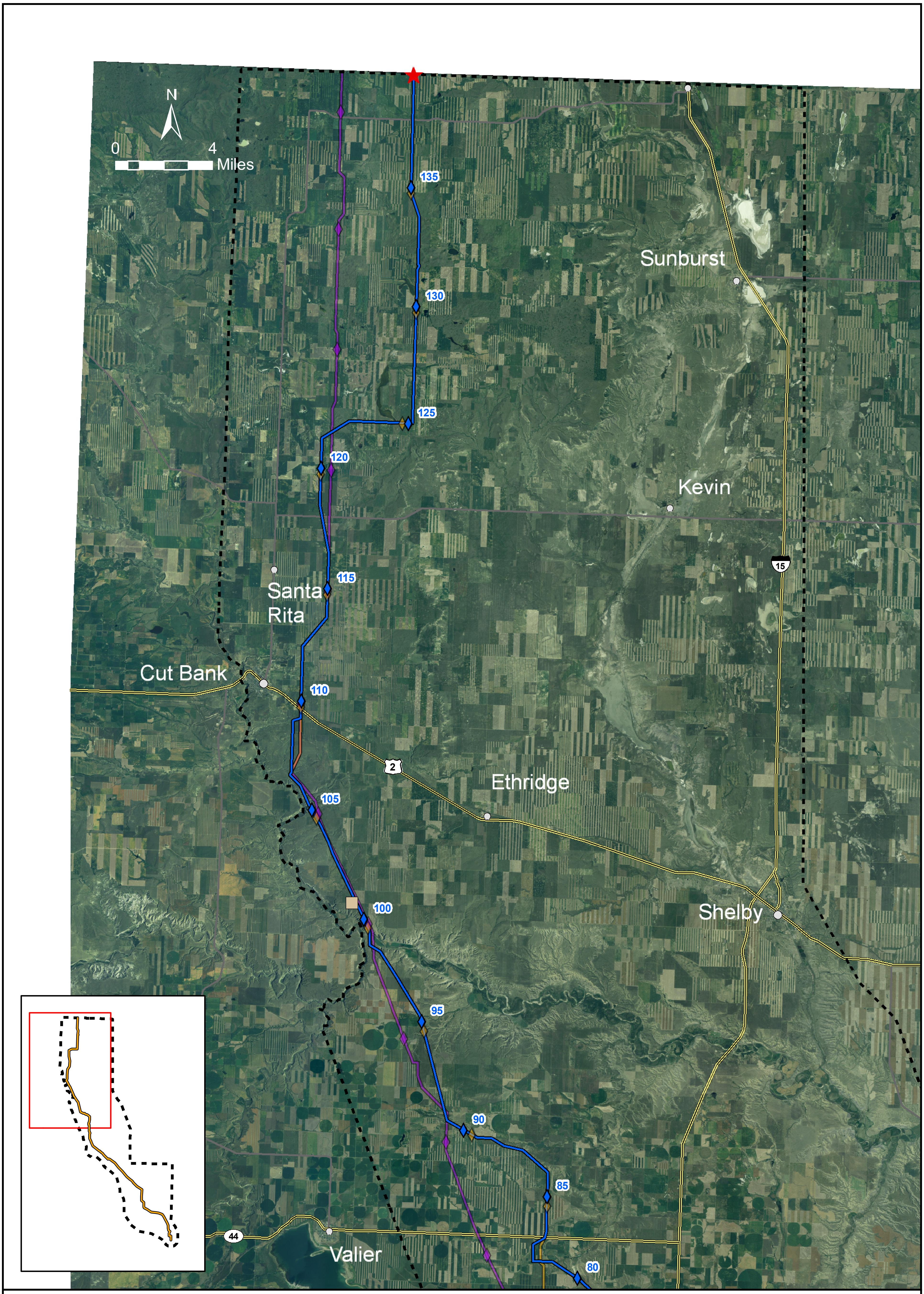
GIS map by Ed Madej -TTEMI-HE Fig2_5-3_MATL_ALT4_Alignment_Middle_020107_JA.mxd



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Sunburst
Kevin
Santa Rita
Cut Bank
Ethridge
Shelby
Valier
15
2
44

**FIGURE 2.5-4
ALTERNATIVE 4 ALIGNMENT
NORTH**

LEGEND
ALT 4 - ALIGNMENT
ALT 4 MILE MARKERS
ALT 2 - ALIGNMENT
ALT 2 MILE MARKERS
ALT 3 - ALIGNMENT
ALT 3 MILE MARKERS
CITIES AND TOWNS
ALIGNMENT END AND EXIT POINTS
STUDY AREA BOUNDARY
MAJOR HIGHWAYS
SECONDARY ROADS
MARIAS SUBSTATION

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig2_5-4_MATL_ALT4_Alignment_North_020107_JA.mxd

After paralleling Alternative 2 for about 2 miles, the Alternative 4 alignment would diverge from the Alternative 2 alignment approximately 8 miles southeast of Brady. After approximately 3 miles running directly west, Alternative 4 would turn northwest for approximately 1½ miles, then turn directly north for approximately 18 miles, then turn directly west, heading for the Dry Fork of the Marias River. After the alignment crosses the existing WAPA 230-kV transmission line, approximately 2 miles south of Ledger, it would intersect the Dry Fork of the Marias. The alignment would generally parallel the Dry Fork of the Marias River until it would cross Interstate 15, then head northwest along Big Flat Coulee for approximately 8 miles. The alignment would turn west for approximately 1 mile before crossing Alternative 2, approximately 4 miles north of the Dry Fork of the Marias River crossing. The portion of the alignment along Dry Fork of the Marias and Big Flat Coulee would minimize diagonal crossing of farm land, avoid crossing farm land by traversing uncultivated land, and avoid residences and paralleling of pipelines.

After crossing Alternative 2 near milepost 73, the Alternative 4 alignment would run slightly west of the Alternative 2 alignment for about 1 mile, just north of Belgian Hill, and would be located farther away from four residences. The Alternative 4 alignment in this area would reduce visual impacts, although some diagonal crossing of farmland is required. The alignment then rejoins the Alternative 2 alignment around milepost 74.

Just south of Highway 2 near milepost 97, the Alternative 4 alignment would be located approximately ¼ mile west of Alternative 2 for a 2-mile stretch. This location would better follow property boundaries and be located farther away from residences. The Alternative 4 alignment rejoins the Alternative 2 alignment near milepost 99 and follows the Alternative 2 alignment north for approximately 30 miles to the border crossing.

Design Features of Alternative 4

In order to minimize impacts to farmland on croplands and CRP, the transmission line would use monopole construction design in areas used for croplands and CRP. Monopole construction design is shown in **Figure 2.3-6**. The design characteristics are summarized in **Tables 2.3-1 and 2.3-2**. The Alternative 4 alignment crosses 87.9 miles of cropland and CRP.

DEQ would apply environmental specifications to the Project (**Appendix F**). DEQ's draft Environmental Specifications identify general environmental protection measures and sensitive areas for site-specific specifications.

In addition to those sites described under Alternative 2, bird markers would also be used where recommended within ¼ mile of wetlands. To implement this measure, FWP and FWS biologists would be invited to field verify sites identified for markings.

To decrease the line's contrast and visibility, non-shiny conductors would be used. Steel monopoles would be self-weathering to decrease contrast.

In order to make the transmission line more visible to low flying aircraft navigating by the roads, ball markers would be used where the line crosses the following major roads: Interstate 15 and U.S. Highways 87 and 2. Marker balls would also be placed at all river crossings.

2.6 Related Future Actions

Related future actions are those related to the proposed Project by location or type. For this review, the potential that MATL would upgrade the capacity of the line from 300 MW north and 300 MW south to 400 MW north and 400 MW south (600 MW to 800 MW), wind farms, and other energy generation or transmission projects in northcentral Montana are discussed below.

Related Future Actions in Cascade, Teton, Chouteau, Pondera, Toole, and Glacier Counties

Future actions that could occur in the Project study area include the development of wind farms, a hybrid energy project (wind and biodiesel), and a new coal-fired power plant near Highwood. Depending on the scope and size of future wind farm developments, MATL could upgrade the total capacity of its transmission line from 600 MW to 800 MW.

MATL Sale of Transmission Capacity

MATL offered two opportunities (called open seasons) for potential generators to bid on the available capacity of the Project (300 MW each direction for a total of 600 MW). The first open season was held between February 3, 2005, and April 15, 2005. The second open season occurred between June 9, 2006, and June 30, 2006. Using the open season process, MATL has sold 600 MW of firm capacity on the proposed transmission line to four potential wind farms. The bids MATL accepted are summarized in **Table 2.7-1** below. Two of the potential wind farms have bowed out of the project. The four generation facilities listed in **Table 2.7-1** are related future actions; however, because the wind farm developers have not yet sold the power to utilities, cooperatives, or other customers, there is no guarantee that these projects will be built.

TABLE 2.7-1
BIDS ACCEPTED BY MATL

Company Name	Total Awarded MW	Direction of Power Flow	Contract Term (years)	Project Name, Location
Great Plains Wind and Energy	120	South to North, Cut Bank to Alberta	15	McCormick Ranch Wind Park, Glacier and Toole counties; Rim Rock Wind Farm, northwest Toole County
Wind Hunter LLC	120	North to South	25	Unnamed, unknown
Invenergy Wind Montana	180	North to South	25	Unnamed, unknown
GE Energy Inc.	Original = 175 Current = 0	North to South	15	GE wind has bowed out of the project. (Thornton 2006)
TransCanada Power	Original = 25 Current = 0	North to South	5	TransCanada has bowed out of the project (Railton 2006)

Notes:
MW = megawatt

Another related future action is the potential upgrade of the MATL line from 300 MW in each direction (600 MW total) to 400 MW in each direction (800 MW total). MATL may construct the line using conductors and insulators designed to carry the additional wattage. With increased line capacity, the electric field at the edge of the right of way would increase and the mean magnetic field would also be higher based on the increased wattage.

GE Energy had an agreement for 175 MW of firm transmission capacity with MATL (MATL 2006b) that would allow it to transmit power southward from Cut Bank to Great Falls, Montana. GE Energy and TransCanada did not respond during the second open season and have now backed out of the project (Railton 2006; Thornton 2006).

All firm shippers on the MATL line would have the ability to sell unused capacity to a secondary market during periods when they can not use their full capacity. Redirect rights would be available to other buyers and sellers of electricity from a wide variety of sources including coal, hydro, gas, biofuels, and nuclear sources. In theory, these sources of electricity may originate from anywhere within the western interconnect. MATL is planning on instituting an auction trading system for firm and non-firm capacity. MATL plans to purchase an Open Access Same Time Information System (“OASIS”) from Open Access Technology International, Inc. The OASIS system would allow capacity owned by MATL or its firm customers to be auctioned to the highest bidder on a monthly, weekly, daily, and hourly basis.

Great Plains Wind and Energy – McCormick Ranch Wind Park

Great Plains Wind and Energy has an agreement for 120 MW of firm transmission capacity with MATL that would allow it to transmit power northward from Cut Bank into Alberta. According to MATL (MATL 2006b), in certain circumstances Great Plains Wind and Energy may use its "redirect rights" to transfer power from north to south. The McCormick Ranch Wind Park Project would be located between the Marias River north to Hjartarson Road and between McCormick and Sullivan Bridge roads. The 120-MW McCormick Ranch Wind Park on 12,000 acres in Glacier and Toole counties would have from 45 to 60 wind turbines. It is slated for production in 2007 or 2008. Once the construction is complete, it would take at least 15 technicians to run the project and maintain it 365 days a year.

Great Plains Wind and Energy – Rim Rock Wind Farm

This project is planned by Great Plains Wind & Energy. The Rim Rock Wind Farm would be located in northwest Toole County on 15,000 acres of privately owned land. This project potentially would be built in phases and would be capable of producing in excess of 200 MW of electrical power. It is planned for construction in mid-2007 through 2008. Power would possibly be transmitted over transmission systems owned by MATL, NWE, or WAPA. This project has the potential of being the largest production wind farm in Montana.

Wind Hunter, LLC – Unnamed Wind Energy Project

Wind Hunter, LLC has requested 120 MW of transmission capacity on the proposed line. Wind Hunter, LLC has proposed to construct, operate, and maintain a wind generation facility in Valley County, Montana, about 26 miles north of the city of Glasgow. Wind Hunter has expressed interest in constructing wind energy projects in the Cut Bank area.

Invenergy Wind Montana – Unnamed Project

Invenergy Wind LLC is headquartered in Chicago and has operational wind farms in four states including Montana. Its existing Montana wind farm, the Judith Gap Energy Center, is located in Wheatland County in central Montana. Invenergy is interested in constructing other wind energy projects in Montana, potentially in the Cut Bank/Shelby area.

Coal-fired Highwood Generation Station – Southern Montana Electric

Southern Montana Electric Generation and Transmission Cooperative, Inc. proposes to build a 250-MW coal-fired power plant and 6 MW of wind generation at a site east of Great Falls, Montana. The final EIS for this proposed project was released in January 2007 (USDA Rural Utilities Service and DEQ 2007).

2.7 Alternatives Considered But Dismissed

Several alignment and construction-detail alternatives were considered but eliminated from detailed study. A table listing these alignment alternatives is provided in **Appendix G**. Detailed analyses of these alignment alternatives under MFSA are provided in the MATL MFSA application (MATL 2006b). Alternatives considered but dismissed from further study, are discussed below, along with the rationale as to why each was eliminated from further study. Other local routing alternatives that were evaluated by DEQ are discussed in **Appendix A**.

Development of Alternative 4 (Possible Local Realignments)

During the development of Alternative 4, DEQ considered eight possible local realignments to address specific scoping issues. The eight local realignments are presented below as segments A1, A2, B1, B2, C1, C2, D, and E. In assembling Alternative 4 as a whole and addressing scoping issues, DEQ selected segments A1, B2, C1, the north half of D, and E. Alternative 4 is fully described in Section 2.5. As discussed in Section 2.5, the DEQ director may select only some of the segments included in Alternative 4 as mitigations to address land use and visual resource issues. Therefore, all of the segment descriptions are included here for information. DEQ's analysis of these segments and the information that helped in the selection of segments for Alternative 4 are included in **Appendix A**.

West Great Falls Realignment Segment A1

Alternative segment A1 is an alignment that would diverge from the southern 23 miles of Alternative 2, to avoid diagonal crossing of farm land, where possible. Where Alternative 2 would go directly north out of the Great Falls switch yard, segment A1 would take a west-northwesterly path out of Great Falls paralleling the railroad and WAPA 230-kV transmission line, making use of an existing transportation corridor. The segment A1 alignment would head west and then north along the railroad and rejoin Alternative 2 where it leaves 8th Road. Segment A1 is the only segment that would run south and west of Benton Lake National Wildlife Refuge.

Shooting Sports Complex Realignment Segment A2

Approximately 1½ miles north of Great Falls, Alternative 2 would turn directly west for a mile and then run directly north along the west side of the Great Falls Shooting Sports Complex. Segment A2 is a 4.2-mile-long alignment that would continue directly north from Great Falls along the edge of cropland and parallel to the access road on the east side of the Great Falls Shooting Sports Complex. The alignment would parallel the existing 161-kV NWE transmission line between Great Falls and Havre. Segment A2 would rejoin Alternative 2 where it crosses Highway 87. This alignment would minimize crossing of farmland.

Diamond Valley Right Angle Realignment Segment B1

Segment B1 is a 5.9-mile-long alignment addressing the area in Teton County 2 to 5 miles south of the Teton River. In the headwaters of Kinnerely Coulee, segment B1 would run directly north where Alternative 2 turns northwest. After running directly north for approximately 2½ miles, segment B1 would turn directly west running approximately 3 miles until it would rejoin Alternative 2 in the vicinity of Hunt Coulee. This alignment would avoid diagonal crossing of farm land.

Diamond Valley and Teton River Realignment Segment B2

Segment B2 is a 6.5-mile-long alignment that would diverge from Alternative 2 at the same location as segment B1. Where the segment B2 alignment intersects the Alternative 3 alignment and existing NWE 115-kV transmission line, it would parallel the line for approximately 3 miles until it would turn west to join Alternative 2 just south of the Teton River. Segment B2 would cross Hunt Coulee approximately ¾ mile north of the Alternative 2 crossing and ¼ mile north of the segment B1 crossing. Segment B2 would then cross the Teton River just east of the location described in Alternative 2. Segment B2 would address a landowner concern over opening a new corridor rather than paralleling an existing line which already has disrupted farming practices in some fields.

Brady Frontage Road Realignment Segment C1

Segment C1 is a 15-mile-long realignment that would diverge from Alternative 2 approximately 8 miles southeast of Brady. Segment C1 would run directly west from the Alternative 2 along the northern edge of the Teton River bank to the Interstate 15 frontage road, and follow the frontage road for about 11 miles, past the town of Brady to rejoin Alternative 2 about 2 miles north of Brady. Segment C1 would closely parallel the existing transportation corridor of Interstate 15 and the frontage road. Segment C1 would decrease crossing of farmland and avoid paralleling one pipeline, but still would roughly parallel a second pipeline.

Conrad Realignment Segment C2

Segment C2 is a 41-mile-long realignment that would diverge from Alternative 2 at the same location as segment C1. After approximately 3 miles running directly west, segment C2 would turn northwest for approximately 1½ miles, then turn directly north for approximately 18 miles, then turn directly west, heading for the Dry Fork of the Marias River. After the alignment crosses the existing WAPA 230-kV transmission line, approximately 2 miles south of Ledger, it intersects the river. The alignment generally parallels the Dry Fork of the Marias until it would cross Interstate 15, then head northwest along Big Flat Coulee for approximately 8 miles. The alignment would turn due west for approximately 1 mile before rejoining Alternative 2, approximately 4 miles north of the Dry Fork of the Marias River crossing. This segment would minimize diagonal crossing of farm land, avoid crossing farm land by traversing uncultivated land, and avoid residences and paralleling of pipelines.

Belgian Hill Realignment Segment D

Segment D is a 2.8-mile-long realignment that would move the alignment slightly west from the Alternative 2 alignment for 2 miles, just north of Belgian Hill, farther away from four residences. The alignment would generally parallel Alternative 2. Segment D would result in greater potential for general local acceptance. This segment would reduce visual impacts. Some diagonal crossing of farmland would be required.

South of Cut Bank Realignment Segment E

Segment E is a 2.5-mile-long realignment that would move the alignment approximately ¼ mile west for a 2-mile stretch, just south of the Alternative 2 intersection with Highway 2. Segment E would move the alignment to follow property boundaries better and is located farther away from residential areas and result in greater potential for general local acceptance. Segment E would generally parallel Alternative 2.

MATL C Alignment

MATL C was presented in the MFSA application (MATL 2006b). The alignment covers 136 miles. The MATL C alignment diverges more from the Alternative 2 proposed Project alignment than the Alternative 3 alignment and is the longest of the alignments MATL presented. The MATL C alignment diverges from Alternative 2 at mile 7 to follow existing north-south and east-west state highway and county road rights of way. The MATL C alignment continues north, changes direction around the eastern side of Woods Crossing, and then goes north for about 16 more miles. The MATL C alignment then goes west towards the town of Brady, south of which it parallels Alternative 2, remaining about 2 to 4 miles east of Alternative 2. North of Conrad, MATL C gradually moves closer to Alternative 2 until joining it at Cut Bank. North of Santa Rita, the MATL C alignment diverges from Alternative 2, heading northwest where Alternative 2 heads north, and cutting across Alternative 2 to head north where Alternative 2 heads east. The border crossing for MATL C is about 1 mile west of the Alternative 2 border crossing.

This alternative was dropped from further consideration because it did not fully address issues raised during scoping. Although it would reduce the total miles of diagonal crossing of farm land, compared to MATL's proposed alignment, MATL C would have crossed more farm land diagonally along the portion beginning south of Brady and continuing to approximately 10 miles north of Conrad. Use of the MATL C alignment would have impacts to visual resources from its alignment very close to several residences. The MATL C alignment would not use as much range and pasture land, or parallel existing transmission lines as much as similar alignments developed by MATL and DEQ west of Great Falls. The Alternative 2 segment west of Great Falls would more closely parallel an existing transmission line than would the MATL C alignment.

Building the Line Underground

As discussed in Chapter 3, overhead transmission lines and associated support structures interfere with some land uses. Burying the line underground would reduce long-term visual impacts and may reduce long-term impacts for some land uses such as farming. Underground lines would still require ground disturbance. An underground line would be less susceptible to weather related outages.

Underground 230-kV lines would cost between 2 and 15 times the amount required to build an overhead line (Georgia Transmission Corporation 2006; Verbund 2006). Cost to build underground may be slightly more than $1 million per mile (Energy Central News 2007), compared with MATL's estimate of about $293,500 per mile using H-frame structures.

Digging trenches to bury the lines would result in greater construction disturbance to the land and would require greater time to install. Above ground access vaults would need to be constructed as well as above ground structures at line termination points. Buildings on the alignment would be restricted. Vegetation may have to be restricted to avoid reducing soil moisture that is needed to cool the transmission line. Problems with underground systems would also be more difficult to locate and repair. Studies indicate that EMF levels from power lines buried underground are similar to EMF levels for power lines above ground (NIEHS 1999).

Unguyed, Self-Supporting Angle and Dead-End Structures

Changes in direction and dead-ends on a transmission line require additional support in the form of guy lines or bulkier self-supporting structures. Guy wires can increase interference with farm equipment and take additional land out of cultivation compared to non-guyed structures, resulting in increased land use impacts. Eliminating the use of guy lines would reduce some of the impacts on land uses. However, this alternative was dismissed because of the higher costs for these self-supporting structures compared to guy wires.

Requiring the Use of Helicopters to String the Line

The use of helicopters may avoid construction of some access roads. Helicopters are most frequently used in extremely hilly terrain or large marshy areas where access is difficult. Using helicopters to string the conductors would create an additional expense. Using helicopters would not eliminate any of the work for the stringing crew, and it would not eliminate the installation of sheaves (pulleys used to string the line). Special sheaves would need to be purchased or rented so that the conductor and ground wires could be installed from the air. Access roads would still be needed for maintenance over the life of the line. This alternative was dismissed because most of the study area is accessible from the ground.

Requiring Monopole Structures in all Areas

A monopole design would reduce some interference with land uses that the H-frame design would have. MATL has indicated that monopole designs would be 11 to 18 percent more expensive on average to build. The use of monopoles in all areas was dismissed, but use of monopoles as a mitigation applicable to CRP and croplands is being considered.

Northwest Alternatives

Alignment selection from the U.S./Canada border to Cut Bank, approximately 25 miles south, required MATL to consider several alternatives. Alternative border crossing locations were dismissed based on routing conditions in Alberta. Alternative alignments between the border and Cut Bank were dismissed based on land use criteria such as: avoidance of occupied residences, an abundance of prairie pothole wetlands, and avoidance of Blackfeet Reservation land.

Eastern Alternative

MATL conceptually considered a Canada/U.S. border crossing near the Coutts/Sweet Grass Port-of-Entry along U.S. Interstate 15. Alignment alternatives considered in this vicinity would parallel Highway 4 from Lethbridge to Coutts/Sweet Grass, and roughly follow Interstate 15 from the border south to Shelby. This alignment would have afforded the project an opportunity to maintain infrastructure development in a common corridor, as well as avoiding protected lands in the Milk River Hills of southern Alberta.

South of Shelby, the eastern alternative would have traveled diagonally cross-country to the southeast for a distance of approximately 12 miles before heading directly south for almost the entire remaining distance to its tie-in at NWE's 230-kV switch yard north of Great Falls. Several factors contributed to MATL's dismissal of the eastern alternative including:

- In southern Alberta, the Eastern Alternative would potentially compromise the safety control system on the rail line that parallels Highway 4.
- Land development patterns in southern Alberta and in the Shelby area would necessitate the use of a stairstep-like centerline resulting in increased distances and numerous angle structures requiring guy wires.

- The topographically rugged "breaks" of the Marias River occur approximately 6 miles south of Shelby. The steep and highly eroded topography at this crossing location is relatively wide (approximately 6 to 7 miles) and would result in additional project costs to meet engineering challenges.
- The Marias River breaks area is relatively undisturbed, which presents the potential for a greater number of archaeological sites.

Cut Bank to Shelby Alternatives

MATL would build the line to Cut Bank and then to Shelby and tie into WAPA's system there in order to complete a transmission path to Great Falls. In that way, energy producers or other subscribers that would need to move power south on the line would pay MATL a transmission tariff to get the power to Shelby and then would have to pay WAPA's tariff to move power from Shelby to Great Falls. WAPA's tariff of $2.69 per kW-month (kW/Mo.) would represent a substantial increase in the cost of transmission for users of the proposed line over paying the MATL tariff alone. MATL's varying tariffs on its line, which were bid by successful shippers in two open seasons, range from $3.01 kW/Mo. to $4.04 kW/Mo.[1] These two rates together would almost double the total tariff in certain cases and would likely price most subscribers out of using the line.

In a variation of this alternative, MATL and WAPA would cooperatively rebuild portions of the current WAPA Shelby-Great Falls 230-kV line, thereby creating a double circuit transmission line in certain parts of the path. WAPA cannot agree to this. A double circuit line would lower reliability for the operating system. The loss of one structure would affect both circuits. The loss of a structure on one of two parallel single circuit lines would affect just one circuit. WAPA also has reservations about building a parallel line in the same right of way as its Shelby-Great Falls route due to the potential for induced current between two lines located close to one another.

Besides the increased tariffs and decreased line reliability, these alternatives were dismissed because of operating limitations of WAPA's "West Control Area." These limitations are due to WAPA's lack of additional generation capacity reserves on its system that would be needed to support the wind projects proposed for the MATL project. The hydroelectric generators at Fort Peck Dam are the primary sources of these "regulating reserves" on the west system, and generation capacity is severely limited by the current drought conditions and resultant stream flow limitations.

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[1] *http://www.matl.ca/documents/Transmission%20requests%20July%2014,%2006.pdf*

NWE 115-kV Transmission Line Rebuild Alternative

Combining MATL's transmission line with NWE's existing 115-kV line would minimize potential environmental impacts. With that impetus, MATL considered rebuilding and updating, as necessary, NWE's existing 115-kV transmission line between Cut Bank and Great Falls and engaged in discussions with NWE regarding its feasibility. This rebuild alternative proved prohibitive based on the logistics of maintaining service while the line was being rebuilt and upgraded and the economics associated with a partnership and existing line rebuild.

3.0 Affected Environment and Environmental Impacts

Information presented in this chapter describes the relevant resource components of the affected environment. Only resources that could be affected by the alternatives, or that could affect the alternatives if implemented, are described. Data and analyses presented in these sections correspond with the importance of the impact and with concerns raised during the scoping process. The following resource areas are presented in this chapter: land use and infrastructure, geology and soils, engineering and hazardous materials, electric and magnetic fields, water, wetlands, vegetation, wildlife, fish, threatened and endangered species, air quality, noise, socioeconomics, cultural resources, visuals, and the transmission grid. Section 3.17 summarizes the findings DEQ must make to certify the project under MFSA.

The location and extent of the affected environment for the alternatives depend on the resource under evaluation. For most resources, the affected environment analysis area for the transmission line is the 500-foot-wide alignment for each alternative. Where affected environment resource analysis areas extend beyond the construction area, the extended area is described at the beginning of the resource area section, and in many cases corresponds to MATL's study area (MATL 2006b) shown in **Figure 1.1-1**.

After the affected environment for each resource has been described, the impacts of the Project and alternatives are discussed, including the direct and indirect impacts, and short-term and long-term impacts. Short-term impacts are defined for this project as those that would take place during the construction phase. The construction phase is expected to last six months. Long-term impacts are defined for this project as those that would take place during the operation and maintenance of the line. The cumulative impacts for each resource are discussed in Chapter 4. Chapter 4 also includes a discussion of unavoidable adverse impacts and irreversible and irretrievable commitments of resources. The text includes detailed descriptions for impacts and resources relevant to identified issues of concern (Section 1.6).

3.1 Land Use and Infrastructure

This section describes the human use of the land for economic production, and for residential, recreational, or other purposes.

3.1.1 Analysis Methods

Quantitative analysis of the number of miles included in a transmission line alignment, and the associated number of acres and land use was based on Geographic Information System (GIS) analysis of the action alternatives. Assumptions needed for GIS analysis included:

- Existing land uses were developed from interpretation of orthophotographs (aerial photographs with distortion removed) taken in 2005 (Montana NRIS 2006a). Some land uses may have changed since the photographs were taken. **Appendix H** presents land use by milepost for each alternative.

- Existing ownership information was developed from county plats and other sources. Information is believed to be accurate and up to date. However, some recording errors may have occurred, or lands may have been sold since the GIS information was developed.

Analysis Area

The analysis area for land use and infrastructure is the study area defined in MATL's permit application (MATL 2006b). Detailed analysis was conducted along the 500-foot-wide transmission line proposed alignment and alternatives.

Information Sources

Data and information for this section were compiled and refined from several sources including, but not limited to, computer assisted mass appraisal (CAMA), GAP Analysis data, and photographic interpretation and other sources. MATL verified this information by ground reconnaissance during July and August 2005. In addition, MATL contacted federal, state, and local regulatory personnel by telephone and in person to validate existing information and to solicit additional information. This information was included in the MFSA application (MATL 2006b).

DEQ also verified land use information in the summer of 2006 by:

- conducting a general reconnaissance field trip of the alignments from Great Falls to the U.S.-Canada border,

- field verifying physical features and land uses along portions of the alternatives by driving along the alignments, recording observations, and taking periodic Global Positioning System (GPS) readings, and
- overlaying the alignments on 2005 orthophotographs (Montana NRIS 2006a) and documenting visible land uses by milepost (See **Appendix H**).

The land uses documented included: mechanically irrigated cropland, non-irrigated cropland, rangeland/native vegetation, forest, residential, existing rights of way, riparian habitat, and water. Information was generally mapped at a scale of 1:24,000.

Information describing the existing transportation and utility networks was obtained from the MFSA application (MATL 2006b) or from Mr. Jim McDonald, Teton County road foreman. Details regarding farm tractors and tillage equipment were obtained from an interview with Mr. Bruce Broesder, service warranty writer for Torgersons, Inc. in Great Falls, and timelines for planting and harvesting were obtained from Mr. Sherwin K. Smith, Executive Director of the Teton County Farm Services Agency in Choteau. Mileages were derived from GIS.

3.1.2 Affected Environment

The following land uses and ownership categories are described in this section:

- Cities, towns, unincorporated communities,
- Developed residential, industrial, and commercial areas adjoining cities and towns,
- Federal and state highways and county roads,
- Railroads and railroad rights of way,
- Existing electric transmission lines,
- Communication facilities,
- Military installations,
- Conservation easements,
- Public and private airports,
- National trails,
- Farmland differentiated by irrigated cropland, mechanically irrigated cropland, non-irrigated cropland, rangeland/native vegetation, and conservation reserve program,
- Mines, and
- Land ownership categories (federal, state, tribal, private).

Land Ownership

Figures 3.1-1, 3.1-2 and **3.1-3** show land ownership in the south, middle, and north parts of the analysis area. **Table 3.1-1** summarizes the proportion of land ownership and jurisdiction within the analysis area (Montana Natural Resource Information System [Montana NRIS] 2006a). The majority (89.7 percent) is privately owned, with the remainder owned or managed by state, federal, and local government agencies. A discussion of public land management, relative to facility siting, is provided below.

TABLE 3.1-1
LANDOWNERSHIP AND JURISDICTION WITHIN ANALYSIS AREA

Ownership	Percent of Analysis Area
Local Government	0.3
Private	89.7
Right of Way	0.6
State Government	6.7
Tribal	0.0
Undetermined	0.0
U.S. Department of Agriculture	0.0
U.S. Department of Defense	0.1
U.S. Government	0.0
U.S. Department of Agriculture Forest Service	0.0
U.S. Department of the Interior Bureau of Land Management	1.5
U.S. Department of the Interior Fish and Wildlife Service	0.5
Water	0.5
Total	100.0

Source: Montana NRIS 2006a

Land Use Categories

Land use categories described in this section are: residential, commercial and industrial, agricultural, publicly managed, and conservation easements.

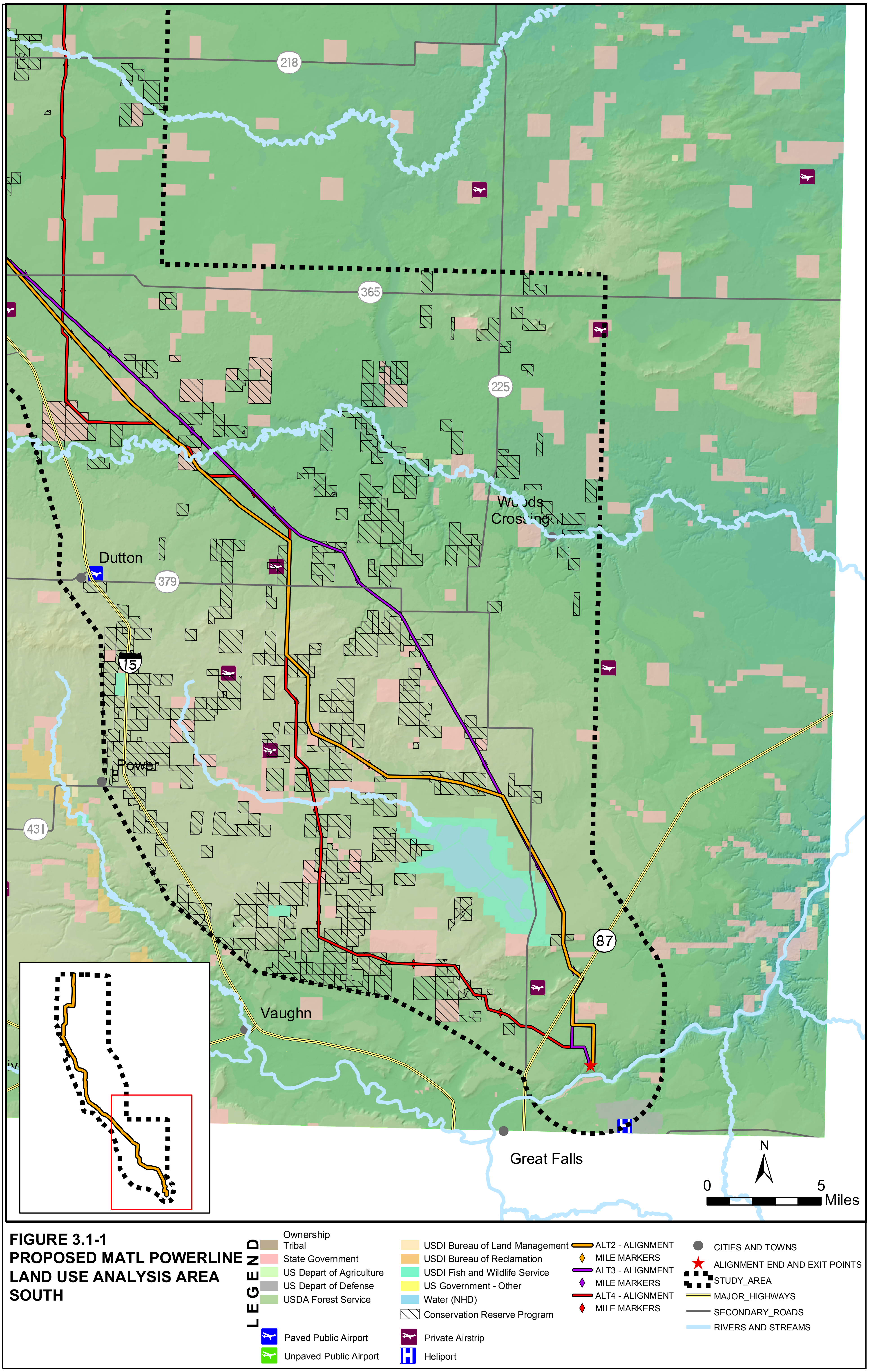

218
365
225
Woods Crossing
Dutton
379
15
Power
431
87
Vaughn
Great Falls
N
0
5
Miles
LEGEND
Ownership
Tribal
State Government
US Depart of Agriculture
US Depart of Defense
USDA Forest Service
USDI Bureau of Land Management
USDI Bureau of Reclamation
USDI Fish and Wildlife Service
US Government - Other
Water (NHD)
Conservation Reserve Program
Paved Public Airport
Unpaved Public Airport
Private Airstrip
Heliport
ALT2 - ALIGNMENT
MILE MARKERS
ALT3 - ALIGNMENT
MILE MARKERS
ALT4 - ALIGNMENT
MILE MARKERS
CITIES AND TOWNS
ALIGNMENT END AND EXIT POINTS
STUDY_AREA
MAJOR_HIGHWAYS
SECONDARY_ROADS
RIVERS AND STREAMS

FIGURE 3.1-1
PROPOSED MATL POWERLINE
LAND USE ANALYSIS AREA
SOUTH

GIS map by Patricia Williams -TTMTI 3-1-1-LandUseAnalysisArea-South.mxd

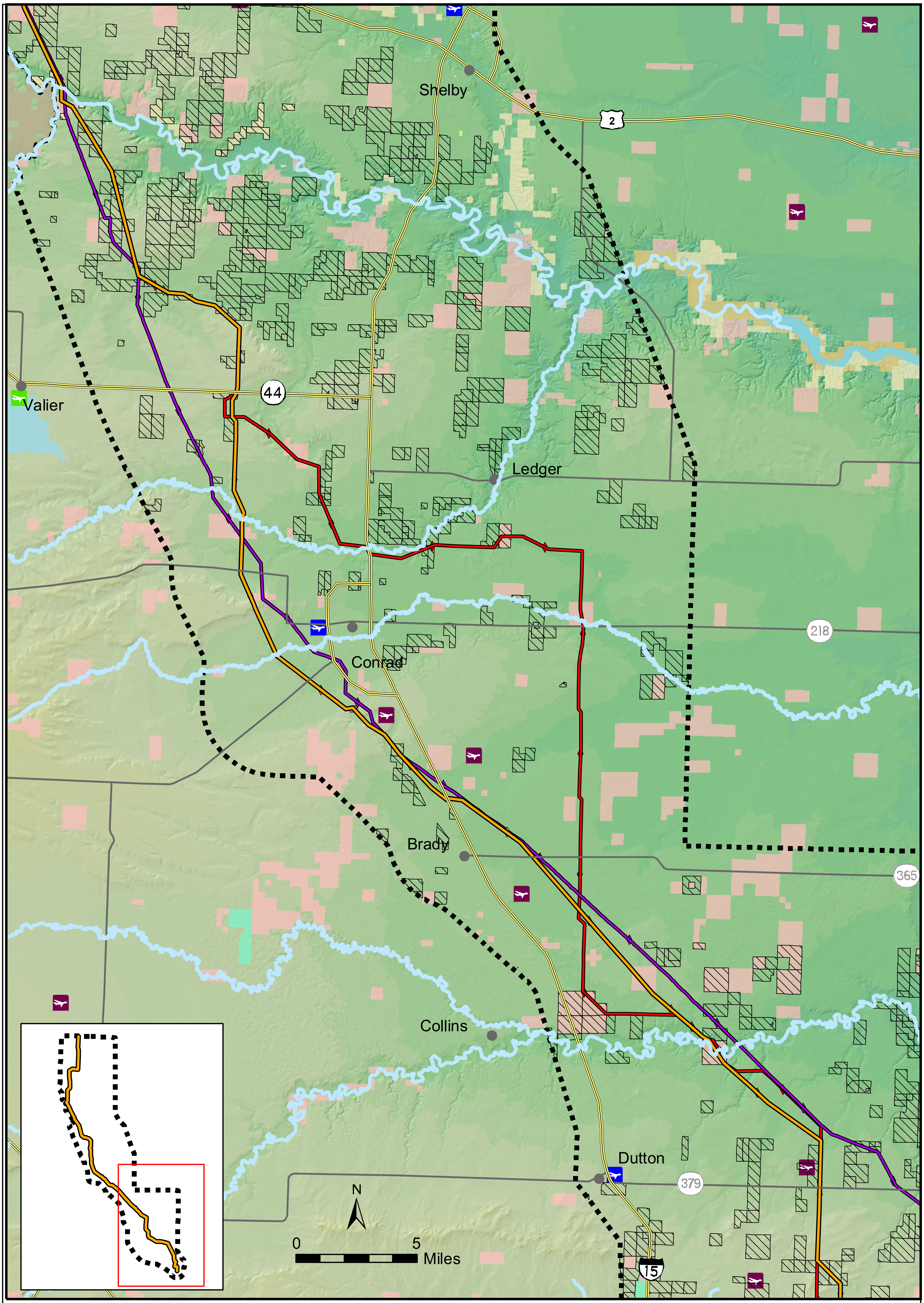

Shelby
2
Valier
44
Ledger
218
Conrad
Brady
365
Collins
Dutton
379
15
N
0
5
Miles
LEGEND
Ownership
Tribal
State Government
US Depart of Agriculture
US Depart of Defense
USDA Forest Service
USDI Bureau of Land Management
USDI Bureau of Reclamation
USDI Fish and Wildlife Service
US Government - Other
Water (NHD)
Conservation Reserve Program
ALT2 - ALIGNMENT
MILE MARKERS
ALT3 - ALIGNMENT
MILE MARKERS
ALT4 - ALIGNMENT
MILE MARKERS
CITIES AND TOWNS
ALIGNMENT END AND EXIT POINTS
STUDY_AREA
MAJOR_HIGHWAYS
SECONDARY_ROADS
RIVERS AND STREAMS
Paved Public Airport
Unpaved Public Airport
Private Airstrip
Heliport

FIGURE 3.1-2
PROPOSED MATL POWERLINE
LAND USE ANALYSIS AREA
MIDDLE

GIS map by Patricia Williams -TTMTI 3-1-2-LandUseAnalysisArea-Middle.mxd

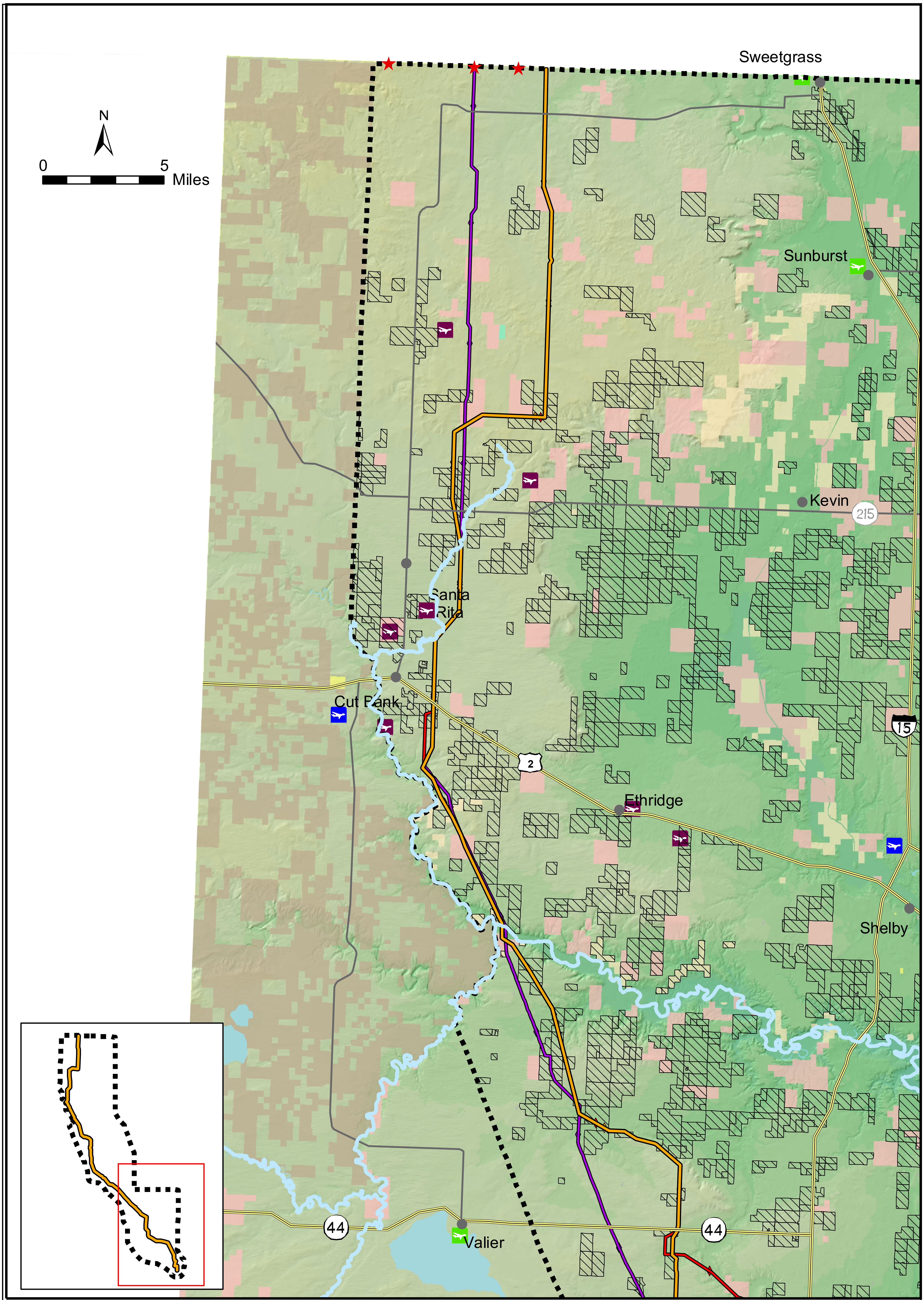

Sweetgrass
N
0
5
Miles
Sunburst
Kevin
215
Santa Rita
Cut Bank
15
2
Ethridge
Shelby
44
Valier
44

FIGURE 3.1-3
PROPOSED MATL POWERLINE
LAND USE ANALYSIS AREA
NORTH

LEGEND
Ownership
Tribal
State Government
US Depart of Agriculture
US Depart of Defense
USDA Forest Service
USDI Bureau of Land Management
USDI Bureau of Reclamation
USDI Fish and Wildlife Service
US Government - Other
Water (NHD)
Conservation Reserve Program
ALT2 - ALIGNMENT
MILE MARKERS
ALT3 - ALIGNMENT
MILE MARKERS
ALT4 - ALIGNMENT
MILE MARKERS
CITIES AND TOWNS
ALIGNMENT END AND EXIT POINTS
STUDY_AREA
MAJOR_HIGHWAYS
SECONDARY_ROADS
RIVERS AND STREAMS
Paved Public Airport
Unpaved Public Airport
Private Airstrip
Heliport

GIS map by Patricia Williams -TTMTI 3-1-3-LandUseAnalysisArea-North.mxd

Residential

Residential land use in the analysis area includes cities, towns, colonies, residential clusters (for example, unincorporated subdivisions), and dwellings (for example, farm or ranch houses). In addition, several Hutterite colonies are located within the analysis area. Cities and towns within the analysis area are:

- Great Falls, in Cascade County,
- Power and Dutton, in Teton County,
- Conrad and Brady, in Pondera County,
- Shelby, Sunburst, and Sweetgrass, in Toole County, and
- Cut Bank, in Glacier County.

With the exception of Cascade County, no land use zoning rules currently apply in the analysis area and no planned subdivisions are currently proposed for future construction in analysis area portions of Glacier, Toole, or Pondera counties (Yeagley 2006). In the Cascade County portion of the analysis area, no planned subdivisions occur (MATL 2006b). In Teton and Chouteau counties, there is no zoning and there are no planned residential developments in the analysis area (MATL 2006b).

Commercial and Industrial

Commercial and industrial activities (linear/point facilities) within the analysis area include communication facilities (cellular telephone and microwave), oil and gas production, surface mining (gravel pits), airstrips (public and private), railroads, pipelines and transmission lines, roadways, and military installations (MATL 2006b). Primary concentrations of communication sites occur in the vicinity of Great Falls, Shelby, and Cut Bank, although individual facilities are distributed throughout the area. Existing commercial and industrial businesses within the study area were located based on parcel information in the CAMA database.

Oil and gas production facilities occur primarily in the northern half of the analysis area and consist of pump and compressor stations, collector and transmission pipelines, meter stations, industrial or processing plants, and product storage tanks, both above and below ground (MATL 2006b). Most oil and gas facilities are associated with production and processing of natural gas or propane, though approximately one-third are associated with crude oil (MATL 2006b).

Several public and private airports or airstrips occur within the analysis area. Public airports include those associated with the towns of Sunburst, Shelby, Conrad, and Dutton (MATL 2006b).

Agricultural

Of the 1,444,790 acres in the analysis area, approximately 1,277,000 acres (88 percent of the analysis area) are considered agricultural lands, including irrigated and non-irrigated cropland and rangeland. **Table 3.1-2** summarizes the proportion of different agricultural land uses in the analysis area. Agricultural lands are almost entirely on privately owned land; however, some dry land crops and grazing occur on public lands within the analysis area.

Irrigated croplands include those croplands irrigated using flood, pivot, and wheel and hand line irrigation systems. Crops grown on irrigated fields in the region are typically hay and alfalfa. Non-irrigated crops are predominately drought resistant cereal grains (MATL 2006b).

TABLE 3.1-2
AGRICULTURAL LANDS IN THE ANALYSIS AREA

Farmland Use	Percent of Farmland[a] in Analysis Area
Irrigated Cropland	4.2
Dry Land Crops	68.7
Grazing	26.9
Wild Hay or Alfalfa	0.1

Notes:

[a] Percentage is based on the percent of parcels where all or a portion of the parcel is in the analysis area. Some parcels may indicate irrigated acres, but those acres may occur outside the analysis area. The “farmland use” category is associated with the parcel, but the location of the type is not mapped within the parcel.

Source: Montana NRIS 2006a

Management of agricultural lands includes the use of GPS guided equipment and vehicles and equipment used for irrigation, aerial and ground based spraying, mechanical plowing, seeding, fertilizing, and harvesting. Some ground based equipment has “booms” extending 90 feet on either side. These activities occur on 73 percent of the analysis area.

Publicly Managed Land

The overall Project area contains about 10 percent public lands (**Table 3.1-1**). Of these public lands, most are managed by the DNRC, FWP, BLM, and FWS (see **Figures 3.1-1, 3.1-2**, and **3.1-3**).

The State of Montana has jurisdiction over 97,318 acres within the analysis area, the majority of which is under jurisdiction of DNRC as school trust parcels. These Montana state trust lands are administered and managed for the benefit of the public schools and the other endowed institutions under the direction of the Montana State Board of Land Commissioners. The real Estate Management Bureau of DNRC's Trust Land management Division is responsible for processing applications for rights of way and easements across surface lands and navigable waterways administered by the state.

FWP manages several wildlife management areas, fishing access sites, and other wildlife and recreation areas.

The primary federal agencies with lands within the analysis area are the BLM and FWS. BLM managed land is located in scattered parcels throughout the northern half of the analysis area (**Figures 3.1-1, 3.1-2**, and **3.1-3**). Right-of-way permits for crossing U.S. BLM managed land are managed by the BLM Lands and Realty office and approved following the appropriate Resource Management Plan compatibility assessment and NEPA review process.

The FWS has management authority of the Benton Lake National Wildlife Refuge, located approximately 10 miles north of Great Falls. FWS also manages three waterfowl production areas (WPA) in the analysis area, one located approximately 6 miles west of Benton Lake, one located approximately 12 miles northwest of Benton Lake, and one located approximately 15 miles northeast of Cut Bank (**Figures 3.1-1, 3.1-2,** and **3.1-3**).

The analysis area also contains several properties owned by the U.S. Department of Defense (**Figures 3.1-1, 3.1-2,** and **3.1-3**). The primary use of such properties is managed by Malmstrom Air Force Base (CAMA 2006).

Final siting of the transmission line on public lands would require MATL to obtain permits from state or federal agencies for rights of way or easements, and would likely require compatibility assessments with these agencies to ensure that localized alignment decisions are made in accordance with the relevant management plans.

Conservation Easements

Within the analysis area are private lands managed under conditions detailed in conservation easements held by both FWS and the USDA Farm Services Agency. FWS holds several acres of wetland easements on private land in the northern portion of the analysis area. Approval to locate facilities within areas managed under wetland easement by FWS is determined by a compatibility review process, which takes into account proposed facility location and access relative to wetland avoidance on the parcel under easement.

FWP currently holds the Lewis and Clark Heritage Greenway Conservation Easement on about 2,400 acres owned by PPL Montana adjacent to the southern boundary of the analysis area. The purpose of the easement is to protect and enhance the open space, natural, and visual resources, when consistent with hydropower production and power transmission activities. The switch yard in which all alternatives would terminate is located on the northern edge of the easement.

The Farm Services Agency holds CRP easements on several thousand acres within the analysis area (**Figures 3.1-1, 3.1-2,** and **3.1-3**). CRP contracts between the Farm Service Agency and private land owners typically preclude agricultural activities on land managed under the program. Facility siting on CRP contracted land requires a compatibility review by the Farm Service Agency to determine a facility's potential impact to the CRP status of the affected property. Haying and grazing of CRP acreage are authorized under limited conditions (USDA Farm Service Agency 2006):

- Managed haying and grazing are authorized no more frequently than 1 out of every 3 years after the CRP cover is fully established. CRP participants requesting managed haying and grazing are assessed a 25 percent payment reduction except when conducted in an "emergency" area.
- Emergency haying and grazing of CRP acreage may be authorized to provide relief to livestock producers in areas affected by a severe drought or similar natural disaster.

Existing Roadway Network

Highways and roads present in the analysis area include the following:

- Federal and state highways
- Paved secondary state highways and county roads
- Improved county roads
- Unimproved roadways

Interstate 15 runs west from Great Falls to Vaughn and then north to the farming communities of Power, Dutton, Brady, and Conrad, and then to Shelby and the Border crossing at Sweet Grass. At Cut Bank the proposed power line would cross U.S. Highway 2, the primary east-west highway along the Hi-Line. North of Great Falls, the proposed power line would cross U.S. Highway 87. The analysis area includes 124 miles of Interstate 15.

Numerous secondary roads are also in the analysis area and include paved federal and state highways and improved (paved) county roads. These roadways run east-west (for example, MT 219 from Conrad to Pendroy) and north-south (for example MT 214 from Cut Bank north to Santa Rita and beyond). There are 86 miles of federal and state highways in the analysis area.

Improved county roads are primarily gravel roadways that serve rural residents. These roadways, in conjunction with improved secondary roads, provide the transportation infrastructure for ranchers and farmers within the Project area. These roads are vital to rural residents, and their use includes hauling grain and cattle and moving large farming tractors and implements. Unimproved roadways are those two-track roads that provide the farmer or rancher with access to and within their owned or leased land. There are approximately 2,346 miles of improved and unimproved county, city, and local roads in the study area.

With the exception of Interstate 15, U.S. Highways 2 and 87, and some sections of the secondary road system, the basic road infrastructure in the study area has changed little in the last 40 to 50 years. Federal and state highways have load restrictions specific to length, width, height, and weight of the transported load. Any exceedance of these criteria requires a single trip permit from MDT.

Most of the county roads have 24-foot-wide graveled driving surfaces (McDonald 2006). Some road shoulders and county bridges may not be suitable for heavy loads (McDonald 2006).

Railroad Facilities

The Burlington Northern and Santa Fe Railway northern tier mainline parallels, for the most part, U.S. Highway 2 through the project area from Shelby to Cut Bank. A north-south line runs from Great Falls through Power and on to the border at Sweet Grass (MATL 2006b). Two branch lines, one to Choteau and another to Valier serve the agricultural producers in those areas. Within the analysis area there are 171 miles of railroad.

Pipeline Facilities

Many existing pipelines serve the oil and gas producers traverse the project area including large natural gas pipelines up to 20 inches in diameter (Cut Bank to Warm Springs pipeline) and many small pipelines serve the oil fields around Conrad, Cut Bank, and Shelby. Many small (4- to 6-inch-diameter) lines from the oil fields near Cut Bank converge at “tank hill“ where crude oil is collected for subsequent delivery to refinery facilities such as Montana Refining in Great Falls. Most of these lines run north-south on the western edge of the project study area with Encana’s 16-inch pipeline the one east-west facility (MATL 2006b).

Aircraft Facilities

Small unmanned airports are located near the towns of Conrad, Shelby, and Cut Bank. Private airstrips are located throughout the study area that serve owners and aerial applicators that serve the agricultural producers.

Other Utilities

When MATL identified its proposed Project alignment in the MFSA application, all pipelines and transmission lines were located so as to avoid placing structures on them. Telephone companies do not have detailed comprehensive databases or maps of buried telephone lines that can be accessed for this application process. MATL would finalize siting with owners of these facilities.

Future Land Use

During scoping, several landowners provided information of planned uses within the analysis area. These include:

- Wind farms
- Additional shooting ranges and a first responder training center at the Great Falls Shooting Sports Complex
- Future conversion of some lands enrolled in the CRP to cropland.

No specific time lines were provided for these activities.

3.1.3 Environmental Impacts

This section describes potential impacts to land uses from the No Action and action alternatives.

3.1.3.1 Alternative 1 — No Action

Under the No Action alternative, the transmission line would not be constructed. There would be no additional impacts on land uses, including farming, GPS, irrigation, crop dusting, production costs, livestock control, or other activities, from transmission lines. Land uses in the area would remain similar to what they are now. Some wind farms that subscribed to the MATL facilities during the transmission open season may not be built.

No impacts would occur to transportation and utilities if the No Action alternative were selected. Current levels of infrastructure use would be maintained.

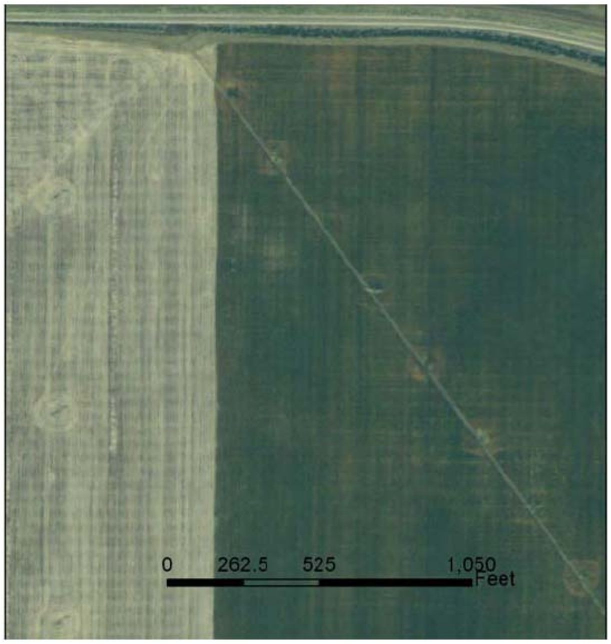
3.1.3.2 Alternatives 2, 3, and 4 — Action Alternatives

Interference with Farming

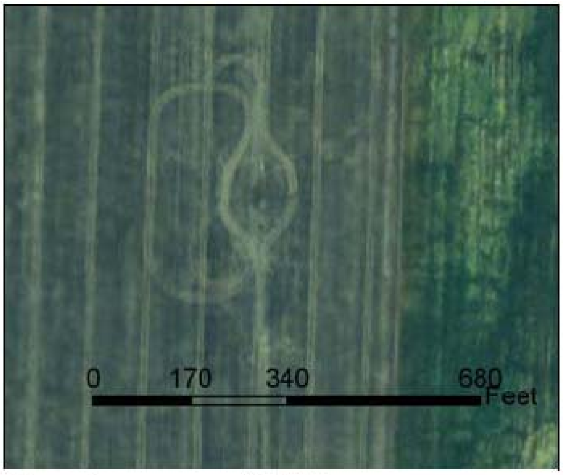
Considerable concern has been expressed by farmers whose land would be crossed by the transmission line. They have identified concerns related to a loss of production, more effort required to farm around transmission line structures, acreage that cannot be farmed due to the structures and access roads, and the introduction of weeds. **Appendix H** contains land uses by milepost for each alternative.

Mechanical irrigation, automated farming methods, farming equipment with large spans (up to 144 feet) for fertilizer, pesticide, and herbicide application, cultivation, harvesting, and crop dusting would all be affected by support structures. These effects could be substantial for an individual operator. Farming equipment continues to become larger and more automated while crops become more "high tech" requiring more precise application and timing. Farmers run the risk of costly damage to their equipment if it strikes a structure. Depending on the location, farming method, and type of structure, acreages would be taken out of production around the base of support structures, and the support structures would be in the way of all equipment (see aerial/orthophotographs below). MATL would compensate farmers for increased production costs and is in the process of revising a method for calculating production costs. This revised method is not yet available for review.

Structures located near the edge of a field may prevent equipment from reaching the edge of the field (see photographs below).



H-Frame on edge of field then diagonal crossing

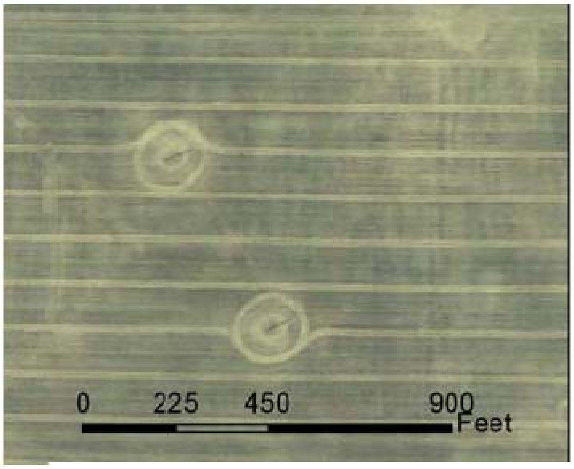


Farming around H-frame

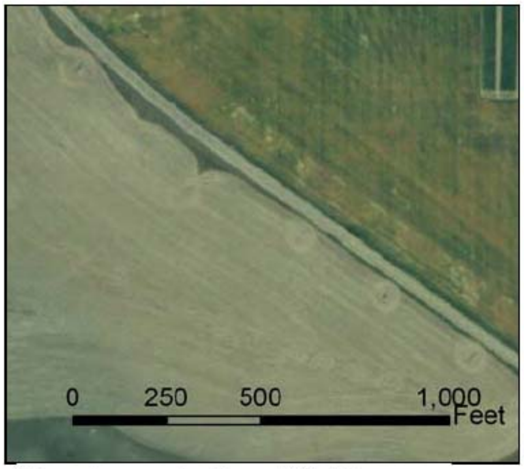
When crossing a cultivated field is necessary, in some cases, effects can be minimized by placement of H-frame structures in a north-south orientation, where the poles are parallel to the rows, avoidance of diagonal field crossings, use of monopole structures in the place of H-frames, and placing structures on the edges of fields.

The worst case scenario for loss of production area is siting H-frame structures diagonally or perpendicularly to rows and structures set close enough to the edge of a field so that farm equipment cannot fit between the structure and the edge of the field (see photograph).

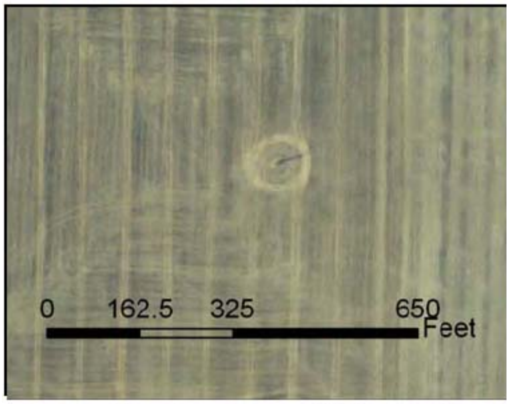
Production costs would increase as farmers have to divert their equipment around structures, make additional passes, take additional time to maneuver equipment, skip areas, or retreat areas. The efficiency of some large, GPS-guided equipment would be adversely affected in fields with diagonal crossing.



Farming around H-frame



Structures at edge of field



Farming around Monopole

0
210
420
840
Feet

Monopole along road adjacent to fields

In conducting the analysis summarized in **Table 3.1-3**, the proposed and alternative alignments were overlaid onto the 2005 orthophotographs (Montana NRIS 2006a) and photographic interpretation was used to document the land use on the alignments. **Appendix H** provides a milepost by milepost interpretation of land uses along each alignment, organized into eight land use types: (1) irrigated cropland, (2) non-irrigated cropland, (3) rangeland, (4) road and rights of way, (5) residential, (6) forest, (7) riparian, and (8) water. **Table 3.1-3** shows the miles of crossings parallel, perpendicular, and diagonal to irrigated, non-irrigated, and range fields along the alternative alignments.

Based on the miles of transmission line that would cross irrigated and non-irrigated cropland at a diagonal, the Alternative 2 alignment would interfere less with farming (52.9 miles of diagonal crossing) than the Alternative 3 alignment (70.4 miles of diagonal crossing). One percent of Alternative 2 and 5.6 percent of Alternative 3 cross irrigated cropland. Twenty-six percent of the Alternative 2 alignment crosses rangeland, compared to 18 percent of the Alternative 3 alignment.

Alternative 4 was developed by DEQ, in part, to reduce the impacts on farming from the proposed transmission line. Overall, Alternative 4 has fewer miles of the alignment crossing non-irrigated cropland at a diagonal (27.0 miles versus 52.8 miles in Alternative 2 and 63.6 miles in Alternative 3). Alternative 4 has the same number of miles of irrigated cropland crossed at a diagonal as Alternative 2 (0.1 mile). Alternative 3 has 6.8 miles.

In the development of the alternatives, several agency-proposed local realignment segments were identified to reduce the number of miles of farmland crossed diagonally, to reduce the total number of miles of farmland crossed, and to reduce the acres removed from farm production by structures. These segments and the quantitative effects on these factors are displayed in **Appendix A**.

TABLE 3.1-3
TYPES OF LAND USE CROSSED BY ALTERNATIVES 2, 3, AND 4 (MILES)

	Alternative 2				Alternative 3				Alternative 4			
	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total
Irrigated cropland	1.4	0	0.1	1.5	0	0	6.8	6.8	1.2	0.5	0.1	1.8
Non-irrigated cropland	34.5	3.9	52.8	91.2	27.3	0	63.6	90.9	47.8	11.3	27.0	86.1
Rangeland	6.3	1.8	25.5	33.6	5.2	0.2	16.2	21.6	8.9	5.2	35.2	49.3
Road/Right of Way	0.2	0.9	0.2	1.3	0.1	0	0.2	0.3	0.2	0.2	0.2	0.6
Residential	0	0	0	0	0	0	0.1	0.1	0	0	0	0
Forest	0	0	0	0	0	0	0.1	0.1	0	0	0.1	0.1
Riparian	0.6	0	1.3	1.9	0.1	0	1.2	1.3	0.8	0.1	0.6	1.5
Water	0	0	0	0	0	0	0.1	0.1	0	0	0	0
Total Miles	43.0	6.6	79.9	129.9	32.7	0.2	88.3	121.6	58.9	17.3	63.2	139.6

Notes:

[a] parallel to north and south (+5° due north or south)

[b] perpendicular to north and south (+5° due north or south)

[c] diagonal to north and south

Sources: Orthophotographs 2005 (Montana NRIS 2006a); NRIS 2000; MATL 2006b; field verification; photographic interpretation (see **Appendix H**).

Land Removed from Production

Table 3.1-4 compares how many miles of transmission line cross CRP land or cropland under each alternative.

TABLE 3.1-4
ACRES OF PRODUCTION IN CRP OR CROPLAND AFFECTED BY H-FRAME OR MONOPOLE STRUCTURES IN ALTERNATIVES 2, 3, AND 4[a]

Segment	Alternative 2	Alternative 3	Alternative 4
Total Miles	129.9	121.6	139.6
Miles of Monopole Crossing CRP or Cropland	0	0	87.9
Number of Monopole Structures[b]	0	0	588 (947)[d]
Acres CRP or Cropland Removed from Production by Monopole	6	6.3	3.7 (1.4)
Miles of H-Frame Crossing CRP or Cropland	92.7	97.7	0
Number of H-frame Structures on CRP or Cropland[c]	742	782	0
Acres CRP or Cropland Removed from Production by H-frame[b]	6.53	6.88	0
Total Acres of Cropland and CRP Removed from Production[c]	**12.53**	**13.18**	**3.7 (1.4)**

Notes:

[a] MATL has provided a range of estimated disturbance for various structures and construction details as plans for the transmission line have progressed (MATL 2006b). Analysis was based on conservative estimates of area disturbed by the transmission line construction and structures.

[b] Monopoles would be set on average 790 feet apart (6.6 structures per miles for long spans), and 490 feet apart (11.5 structures per mile) for short spans.

[c] H-frames would be set on average 600 feet apart (8 structures per mile).

[d] Numbers in parentheses represent short span monopole disturbance.

Sources: Orthophotographs 2005 (Montana NRIS 2006a), NRIS 2000, MATL 2006b; field verification; photographic interpretation (see **Appendix H**)

For the purposes of this analysis, the area removed from cropland production or CRP was assumed to be 5 feet from the structure in any direction. Actual losses could be greater, for example, if a structure is located so close to the edge of a field that equipment could not maneuver between the structure and the edge of the field. Likewise, if structures are located at the edge of a field and parallel to the cropping pattern, actual losses could be minimal. A double-pole “H” frame support, the base area (1.5 feet by 23.5 feet) with 5 feet added to all sides would remove 0.0088 acre (385.25 square feet) from production per structure, whereas monopole supports (1.75 foot pole radius plus 5 feet) would remove 0.0027 acre (143.14 square feet) per structure. Based on this assumption, the 97.7 total miles of transmission line that cross cropland under Alternative 2 would result in approximately 742 H-frame structures, amounting to 6.53 acres removed from production. Alternative 3, with 97.2 total miles of transmission line that would cross cropland, would result in approximately 782 H-frame structures, amounting to 6.88 acres removed from production.

Alternative 4 would require the use of monopole structures in all areas where the transmission line would cross CRP land or cropland, 87.9 miles. Monopole structures require less of a footprint for each structure. Using long-span monopoles in Alternative 4 would result in the use of roughly 588 monopole structures and about 3.7 acres of CRP or cropland removed from production. If short-span monopole structures are used in Alternative 4, about 947 structures would be needed, and they would remove about 1.4 acres from production. Long-span monopoles would remove more acreage from production because of their 6.5-foot-wide concrete foundations. However, there would be far fewer of them to farm around.

During construction and line maintenance, short-term disruption of farming activities along the alignment could occur. Locating structures and access roads in previously disturbed areas, or in areas where agricultural practices have already been modified would minimize long-term impacts along the alignments. Environmental protection measures listed in Chapter 2 would be implemented to reduce potential impacts on land use due to erosion, soil compaction, and noxious weeds.

Interference with Crop Dusters

Experienced crop duster pilots are capable of avoiding conductors and structures by flying over, under, or around them, although additional passes may be required. Nationwide in 2005, there were 90 agricultural aircraft accidents investigated by the National Transportation Safety Board (2006). Of those 90 accidents, 14 included a power line, guy wire, or static wire as a contributing factor (two were fatal), five involved helicopters and the remainder involved airplanes. One was a helicopter that started to crash and hit a power line on the way down. None was in the Project area nor in Montana.

Alternatives 2 and 3 are similar in the number of miles of transmission line that cross agricultural lands (92.7 and 97.7 miles, respectively). Alternative 4 would cross the least amount of CRP and cropland (87.9 miles). Potential impacts would be mitigated as crop dusters would be informed of the transmission line, and maps would be provided prior to and upon completion of the MATL line.

Interference with GPS Guided Farming Equipment

Under Alternatives 2, 3, and 4, potential interference could occur to certain types of GPS systems installed in farm equipment. MATL proposes the following environmental protection measures to address problems with GPS interference:

- MATL would support upgrades to improve the GPS system's resistance to interference. Specifically, physically shielding the GPS antennae from electromagnetic interference, where practicable, would alleviate interference.

> Another potential solution is to upgrade the unit to be compatible with the Wide Area Augmentation System (WAAS). WAAS provides a more extensive coverage area and is less susceptible to signal interference. WAAS augments GPS with additional signals for increasing the reliability, integrity, accuracy, and availability of GPS.

WAAS has an accuracy specification that results in a horizontal accuracy of better than 5 meters. This accuracy would be helpful for GPS guided equipment.

Livestock Control and Gates

Issues related to controlling livestock and gate closure were raised during scoping. In response, all action alternatives include environmental protection measures to ensure gates are installed, closed, and maintained as needed to control livestock and public access in coordination with affected landowners. Although not 100 percent effective, these measures would reduce problems caused by unauthorized access or gates being left open.

Conservation Easements and Special Management Areas

Linear miles of lands under federal/state special management and those lands currently under federal or state conservation easements (wetland easements, CRP, and FWP easements) are summarized in **Table 3.1-5** for each alignment. Alternative 4 would eliminate crossing the Great Falls Shooting Sports Complex.

TABLE 3.1-5
MILES OF FEDERAL/STATE SPECIAL MANAGEMENT AREAS
AND CONSERVATION EASEMENTS CROSSED

	Alternative 2	Alternative 3	Alternative 4
State Land (FWP) – Great Falls Shooting Sports Complex	0.73	0.51	0.12
Montana State Trust Land (DNRC)	10.62	5.91	11.03
Conservation Easements	23.61	(USFWS) 3.76 (CRP) 14.33	(USFWS) 1.7 (CRP) 30.77

Residential Developments

Alternatives 2 and 4 each have one developed residential area that is within 100 feet of each of the alignments. Alternative 3 has four. Impacts on residences are primarily noise and visual quality, and are discussed in those sections. As the safety zone for the transmission line is 105 feet wide, it is anticipated that the centerline would be located at least 52.5 feet from residences.

Planned Land Use

Alternatives 2, 3 and 4 cross through Glacier, Pondera, Teton, Toole, and Cascade counties. All of these counties have adopted a comprehensive land use plan. Cascade County is the only county within the Project analysis area with zoning regulations.

According to the November 15, 2006, version of the Cadastral GIS coverage for Cascade County, there do not appear to be any subdivisions planned or existing in the locations of Alternative 2 or 3 alignments. Alternative 4 crosses the planned Kyles Addition subdivision. No residences are under construction or recently completed in this subdivision.

Right-of-way Restrictions

Farming and other activities are permitted on transmission line rights of way provided that they do not interfere with line operation and maintenance or create safety problems for workers or others.

Landowners may be restricted from constructing buildings or conducting other activities within 52.5 feet of the centerline (depending on location and needed safety zone).

Pipelines

Pipelines are discussed in Section 3.3 and Section 3.4, Electric and Magnetic Fields.

Transportation

Highways and Roads

Environmental protection measures would be followed, as described in Chapter 2, that would minimize the impacts on local access roads, and impacts on highways from crossings. Some minor additional use of roads and highways would occur during construction of the transmission line. Effects would be short term.

Traffic Levels

Agriculture dominates all other land uses within the Project area. The principal activity that would increase traffic on primary, secondary, and other improved roads used by local agricultural producers is traffic associated with power line construction. Several issues would need to be addressed during this period.

A critical element would be timing power line construction and maintenance activities to avoid conflicts with farm machinery. According to Sherwin K. Smith, Executive Director of the Teton County Farm Service Agency, the farm schedule is as follows:

- Fall seeding of winter wheat, September to Mid-October
- Spring seeding of spring wheat, Mid-March to May
- Harvest, July to September or later depending on early snows.

When the existing Great Falls to Cut Bank 115-kV line was constructed in the mid-1960s, a large combine had a 20- to 24-foot header, a big drill was 32 feet, and few, if any, 4-wheel drive tractors were even available. Present day equipment has grown substantially (Broesder 2006). Some of the widths are listed below:

- Combine tread width-large unit 13.1 feet standard, up to 15.1 feet with axle extenders.
- Four wheel drive tractor dual wheels up to 18 feet wide; triples up to 22 to 24 feet wide.
- Air drills (both Case IH and New Holland)-57 foot drill when folded for transport is 20 feet 6 inches wide by 17 feet high.

From these data, conflicts with farm machinery on local roads are unavoidable especially during seeding and harvest. Timing and open frequent communication between the landowners and the contractor(s) would help to reduce impacts. Additionally, the use of pilot vehicles during equipment mobilization and delivery of large, long loads on secondary roads would serve to minimize conflict with ongoing farming activities especially during seeding and harvest.

Airports and Private Airstrips

Alternatives 2, 3, and 4 are each close to two airports, Conrad and Horner Field. The Conrad Airport is a public airport with two runways (one paved and one turf) and serves an average of 74 aircraft per week. Alternative 3 is 0.75 mile southwest of the Conrad airport. Alternative 2 is 2 miles to the southwest of the Conrad airport, and Alternative 4 is 3.7 miles to the northeast. Horner Field is a private airstrip (gravel) (Airnav.com 2006). Alternatives 2 and 3 are 1.55 miles to the east of Horner Field. Alternative 4 is 1.8 miles to the southwest. Information is not available describing the use of these facilities.

Adherence to FAA regulations and coordination of construction activities would minimize conflict with the MATL project. However, construction of the power line, whether parallel to the existing 115-kV NorthWestern line or not, would add to the existing transmission and distribution lines within the project area. Local pilots, those with private airstrips, and aerial spray pilots would be adversely impacted.

Roads and Railroad Crossing and Paralleling

Comments were raised regarding the number of crossings the proposed transmission line would make of roads and railroads.

Support structures adjacent to roads may pose a hazard to motorists, in some cases, if the vehicle leaves the roadway. Because of this, transmission line structures are normally located outside of the road right of way. Additionally, roads are commonly used by aircraft for navigation because they are located on a map and transmission lines parallel to a road could create a hazard for a few aircraft that fly less than 80 to 100 feet above the ground.

Power line construction and maintenance could increase conflicts with train traffic in the project area, especially at uncontrolled crossings. The power line would have to cross a railroad right of way or would run parallel to it at some point along its alignment (MATL 2006b).

The primary impacts to infrastructure would result from power line construction. Follow-up power line maintenance using standard equipment would be an infrequent occurrence and not add greatly to the existing traffic loads on the roadway network.

Direct impacts include increased traffic on major highways and secondary roads, minor delays along these alignments to allow equipment and material to be delivered to specific locations along the alignment, and a traffic stoppage during the conductor stringing phase.

Land Use Mitigations

To minimize adverse environmental impacts to land uses from Alternative 2 and address local land use issues in specific places, DEQ identified several potential mitigation realignments that are described by segments A1, A2, B1, B2, C1, C2, D, and E in **Appendix A.** The realignments that would mitigate land use impacts on a local scale are:

- Segment B2 - Diamond Valley and Teton River Crossing Realignment
- Segment D - Belgian Hill Realignment
- Segment E - South of Cut Bank Realignment

A description of these realignment segments and the agency's preliminary analysis of their environmental impacts are presented in **Appendix A**.

MATL has acknowledged (MATL 2006b) that the maximum cost that MATL can afford, and still meet financial requirements, is approximately $850,000. If monopole structures cost 11.3 percent more than H-frame structures, approximately 25 miles of transmission line could employ long-span monopoles. MATL also acknowledged that long-span monopole design is an appropriate mitigation design to H-frame structures for crossing dry-land croplands. However, the total additional cost must not cause the MATL project to be infeasible.

The use of monopoles would be applied to mitigate diagonal crossing of cropland using a prioritization method. The order of priority would be in the following manner:

1) Highest priority to portions of the certified alignment that cross currently farmed land (not CRP) and that parallel the existing NWE 115-kV transmission line (essentially all portions that parallel NWE's line are on a diagonal)
2) Second highest priority to portions of the certified alignment that cross land currently enrolled in the CRP and that parallel the existing NWE 115-kV transmission line (essentially all portions that parallel NWE's line are on a diagonal),
3) Third highest priority to portions of the certified alignment that cross currently farmed (not CRP) land
4) Fourth highest priority to portions of the certified alignment that cross land currently enrolled in the CRP

Specific locations (identified by mileposts) where DEQ proposes that monopoles could be applied to address local land use issues are outlined in the draft DEQ environmental specifications in **Appendix F.**

3.2 Geology and Soils

Issues of concern associated with geologic resources are: the potential for seismic activity, mass movement, subsidence, and mineral resources. Issues associated with soil resources are soil stability, potential for erosion, compaction, salinity, construction requirements for roads and access, and revegetation.

3.2.1 Analysis Methods

GIS software was used to map the distribution of geologic and soil properties that could be affected by the Proposed Project or alternatives. Geologic information was collected from U.S. Geological Survey (USGS) topographic maps, USGS seismic risk data, geologic maps and data primarily from the Montana Bureau of Mines and Geology (MBMG), and from baseline geology data provided in the MATL application (MATL 2006b). Data for important soil properties, including soil type, soil depth, soil stability, potential for erosion, compaction, salinity, limitations for roads and access, and revegetation, were acquired from the NRCS database (NRCS 2006a), the MATL application (MATL 2006b), and aerial photo interpretation. Geologic and soil resources (slope stability and erosion potential) that could be affected differently by different alternatives were evaluated and compared for each alternative alignment.

Analysis Area

The analysis area for geologic and soil resources is the same as the Project study area. The study area is generally located on relatively flat-lying plains on the eastern slope of the Northern Rocky Mountains (Northern Great Plains physiographic province).

3.2.2 Affected Environment

Geology and soils in the analysis area are described below in terms of characteristics relevant to the issues of concern stated under Section 3.2 above.

Geology

The bedrock geologic units present in the analysis area are primarily Cretaceous shales and sandstones deposited during repeated advances and regressions of the inland sea present from 65 to 135 million years before the present (MATL 2006b). The geologic formations intersected by each alignment are outlined in **Table 3.2-1**. The surface expressions of geologic formations crossed by each alignment extend across the entire analysis area and are nearly flat-lying. At the southern end of the analysis area, the dominant structural feature is the northeast trending Great Falls Tectonic Zone, which thins the Cretaceous shales and sandstones (MBMG 2002a).

TABLE 3.2-1
GEOLOGIC FORMATIONS AT THE SURFACE IN THE ALIGNMENT OF EACH ALTERNATIVE

Geologic Unit or Formation	Miles	Percent
Alternative 2		
Glacial till, late Wisconsinan	62.48	37.5
Two Medicine Formation	51.59	31.0
Kevin Member of Marias River Formation	33.25	20.0
Telegraph Creek Formation	9.77	5.9
Virgelle Formation	3.08	1.8
Alluvium of modern channels and flood plains	1.76	1.1
Alluvium-colluvium	1.61	1.0
Taft Hill Member of Blackleaf Formation	0.92	0.5
Alluvium of alluvial terrace deposits	0.72	0.4
Lake deposits	0.71	0.4
Bootlegger Member of Blackleaf Formation	0.54	0.3
Ferdig Member of Marias River Formation	0.09	0.1
Vaughn Member of Blackleaf Formation	0.09	0.1
Landslide deposit	0.01	0.0
Alternative 3		
Two Medicine Formation	44.29	35.8
Glacial till	38.30	31.1
Kevin Member of Marias River Formation	22.85	18.5
Telegraph Creek Formation	9.00	7.3
Virgelle Formation	3.30	2.7
Alluvium of modern channels and flood plains	2.58	2.1
Alluvium-colluvium	1.89	1.5
Taft Hill Member of Blackleaf Formation	0.42	0.3
Bootlegger Member of Blackleaf Formation	0.25	0.2
Lake deposits	0.21	0.2
Ferdig Member of Marias River Formation	0.19	0.2
Alluvium of alluvial terrace deposits	0.16	0.1
Landslide deposit	0.09	0.1
Vaughn Member of Blackleaf Formation	0.05	0.0
Alternative 4		
Two Medicine Formation	44.58	31.9
Kevin Member of Marias River Formation	29.98	21.5
Glacial till, late Wisconsinan	18.84	13.5
Glacial lake deposit	8.89	6.4
Telegraph Creek Formation	7.51	5.4
Bootlegger Member of Blackleaf Formation	6.88	4.9
Alluvium-colluvium	4.34	3.1
Virgelle Formation	3.29	2.4
Alluvium of modern channels and flood plains	3.06	2.2
Vaughn Member of Blackleaf Formation	2.72	2.0
Glacial till, older	2.66	1.9
Floweree Member of Marias River Formation	1.84	1.3

TABLE 3.2-1 (Continued)
GEOLOGIC FORMATIONS AT THE SURFACE IN THE ALIGNMENT OF EACH ALTERNATIVE

Geologic Unit or Formation	Miles	Percent
Alternative 4 (continued)		
Taft Hill Member of Blackleaf Formation	1.42	1.0
Alluvium of alluvial terrace deposits	1.38	1.0
Alluvium of braided plains	1.20	0.9
Ferdig Member of Marias River Formation	1.06	0.8

The north end of the analysis area is on the west flank of the Kevin-Sunburst dome, which produces a slight westerly dip in the Cretaceous sedimentary rock of approximately 100 feet per mile (MBMG 2002b).

The sedimentary formations that underlie the analysis area include the Kootenai Formation, Blackleaf Formation, Marias River Formation, Telegraph Creek Formation, Virgelle Formation, Eagle Formation, and the Two Medicine Formation. The Marias River, Telegraph Creek, and Two Medicine formations underlie most of the analysis area. The Marias River Formation is the uppermost member and is comprised primarily of dark-gray shale with some limestone and sandstone beds; the Telegraph Creek Formation is a yellowish-gray, fine-grained sandstone with interbedded gray shale; and the Two Medicine Formation is comprised of a non-marine mudstone with thin beds of fine-grained sandstone (MBMG 2002c).

Overlying these sedimentary bedrock formations throughout most of the analysis area are deposits of glacial till, glacial lake sediments, and alluvial materials. The glacial till is composed of grayish-brown unsorted clay-size to boulder-size sediments and rock fragments (MBMG 2002c and 2002d). The thickness of the till typically ranges from 1 to 15 feet, with occasional thicknesses greater than 200 feet (MBMG 2002b and 2002c). Alluvial deposits are present in the analysis area along river and stream channels and are typically poorly sorted to well sorted sand and gravel materials that are locally derived or reworked glacial till (MBMG 2002a).

Potential for Seismic Activity

The potential for seismic activity within the analysis area is low. There are no mapped active faults in the analysis area (USGS 2006b). The nearest faults are the South Fork Flathead Fault and two small unnamed faults near the Sweetgrass Hills (MATL 2006b). The USGS has created models to estimate the peak acceleration for any area within the country. Peak acceleration is used to assess the potential impact of earthquakes on structures. The peak acceleration for the analysis area (with a 10 percent probability of exceedance within the next 50 years) is 4.5 to 6.5 percent of the force of gravity; relatively low compared to elsewhere in the U.S. (USGS 2006b).

Mass Movement

Mass movement is the relatively rapid movement of geologic materials (commonly known as a slump or slide). The potential for mass movement of soil or rock primarily depends on topography and the dip of the bedding planes of the bedrock. The general topography and bedding plane dip slopes of the analysis area are flat with small potential for mass movement. The potential for mass movement is also based on the overall shear strength of the geologic materials. Glacial till is unconsolidated and thus prone to mass movement if located on a slope of 15 percent or greater. Shale is also prone to mass movement on slopes. Areas within the analysis area having the greatest potential for mass movement are found where glacial till materials are positioned on terraces and the incised banks of the Teton River, Marias River, Dry Fork Marias, and Buckley Coulee. **Figure 3.2-1** shows areas in the study area with surficial expressions of shale and glacial till on slopes greater than 15 percent. Examination of aerial photographs of the Teton River crossing indicates there are numerous slumps on the steep slopes.

Subsidence

Subsidence can occur when voids are created in subsurface materials (sinkholes in limestone or subsurface mining) causing collapse of overlying material, or when the withdrawal of groundwater or petroleum causes geologic material to settle. The potential for the creation of voids and subsequent sinkholes within the geologic materials in the analysis area is low to nil due to the absence of limestone. No active or abandoned subsurface mines are located within the alignments of the action alternatives. Subsidence related to the withdrawal of groundwater or petroleum is also unlikely within the analysis area since petroleum is extracted at low to moderate rates and from consolidated bedrock formations. Groundwater pumping in the analysis area does not occur at rates and volumes large enough to cause subsidence.

Mineral Resources

Mineral resources include oil, gas, coal, sand and gravel, and precious metals. Petroleum deposits are found within the Cretaceous rock formations that are mapped from south of Cut Bank to the Canadian border. There are numerous producing and abandoned oil wells present across this portion of the analysis area. South of the Marias River to Great Falls, there are fewer oil wells and fewer known oil and gas deposits. The Cretaceous rock formations also contain deposits of coal.

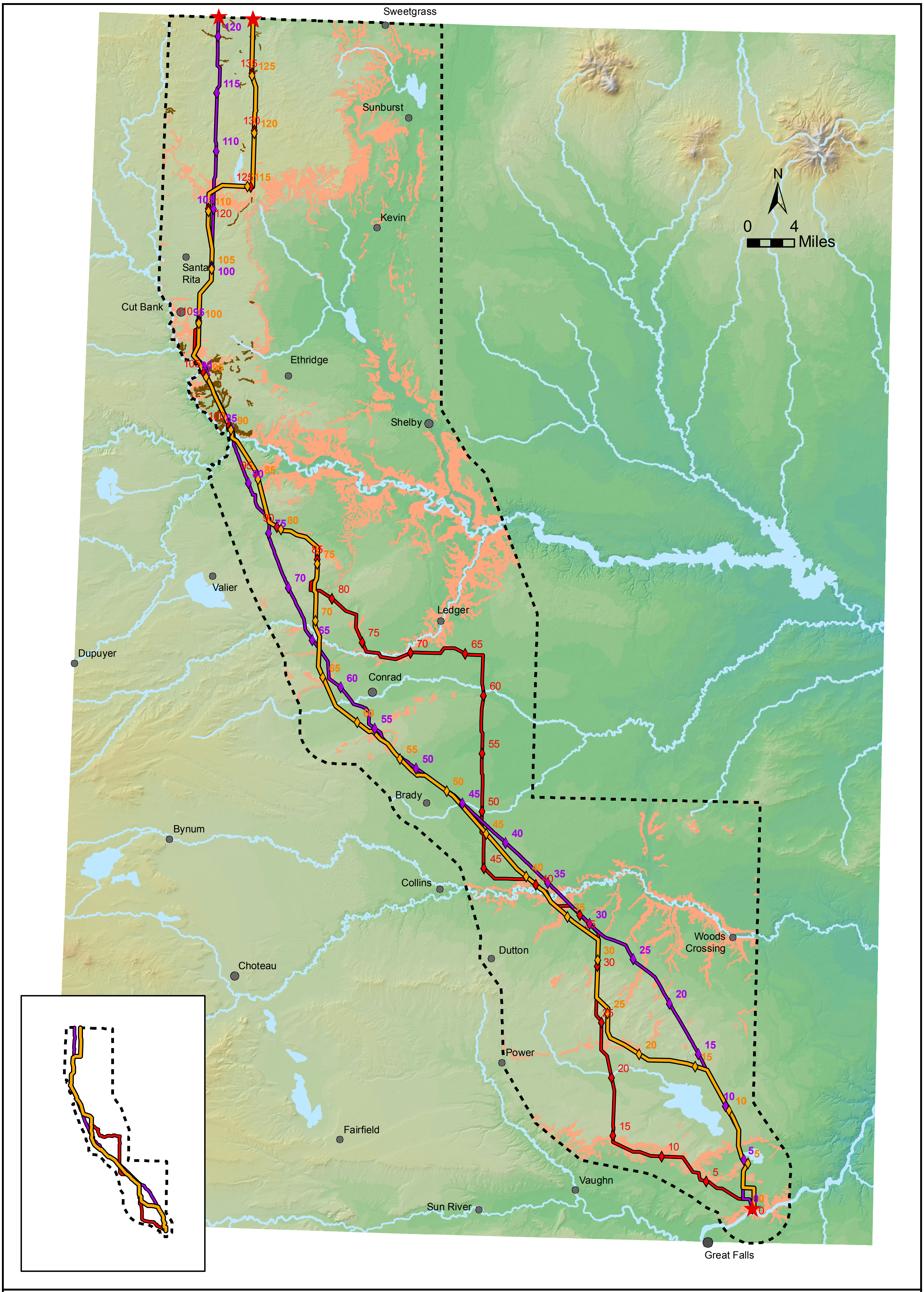

Sweetgrass
Sunburst
Kevin
Santa Rita
Cut Bank
Ethridge
Shelby
Ledger
Valier
Dupuyer
Conrad
Brady
Bynum
Collins
Dutton
Woods Crossing
Choteau
Power
Fairfield
Vaughn
Sun River
Great Falls
N
0
4
Miles

FIGURE 3.2-1
SOIL EROSION POTENTIAL

LEGEND

▨ GLACIAL TILL WITH HIGH MASS WASTING POTENTIAL ON SLOPES > 20%

▨ SOILS WITH HIGH MASS WASTING POTENTIAL ON SLOPES > 20%

ALT2 - ALIGNMENT

◆ MILE MARKERS

ALT3 - ALIGNMENT

◆ MILE MARKERS

ALT4 - ALIGNMENT

◆ MILE MARKERS

● CITIES AND TOWNS

★ ALIGNMENT END AND EXIT POINTS

STUDY AREA BOUNDARY

MAJOR HIGHWAYS

SECONDARY ROADS

RIVERS AND STREAMS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_2-1_MATL_erosian_potential_012007.mxd

Soils

The kinds of soils that have developed in the analysis area are determined by five major factors: (1) climate; (2) living organisms; (3) parent material; (4) topography; and (5) time. Three of the five factors have had a major influence on soil development in the analysis area; they are climate, parent material, and topography. The colder, semi-arid climate has caused soil profiles to be shallow compared to soils from warmer and wetter locales. As discussed in the Geology section above, soils that develop on shale and sandstone bedrock have considerably different parent materials than soils that develop from glacial till and glacial outwash sediments. In addition, topography has local influences due to the erosional downcutting and steeper slopes associated with the major Marias and Teton stream drainages and their associated tributaries.

Soils that form on relatively flat deposits of glacial till are mostly well-drained and fine-textured soils. These soils are suitable for agriculture and rangeland and are rated fair to good for growing grasses, low to moderate for frost action, and high for corrosion of steel (NRCS 2006a). Most of the soils within the MATL analysis area that have developed from the glacial till deposits are classified in the Mollisol soil order (NRCS 2006a). Other soil types, with lesser areal coverage than Mollisol soils, are classified in the Entisol, Inceptisol, and Vertisol soil orders. Only very small areal amounts of Alfisols and Aridisols soils are found within the analysis area.

Soils in the Mollisol soil order characteristically have a dark-colored, relatively thick, and organically rich surface horizon that developed under thousands of years of grassland vegetation (Soil Science Society of America [SSSA] 1997). Within the analysis area, the Mollisol soils typically have a fine- to fine-loamy-grained texture, are well drained, and have formed on stream terraces, alluvial fans, and glacial till plains with slopes less than 10 percent.

Soils in the Entisol soil order are younger and weakly developed soils, compared to Mollisols, with little, if any, profile development (SSSA 1997). Entisol soils are found on very recent geomorphic surfaces (Brady 1990). Within the analysis area, Entisol soils typically are well-drained soils with a fine-loamy to loamy-grained texture. Entisol soils are mapped on flood plains, glacial till plains, and hills with slopes up to 60 percent within the MATL analysis area.

Soils in the Inceptisol soil order are also weakly developed soils with few diagnostic features but are considered to be more developed than the Entisol soils. These soils typically have a subsurface mineral horizon with some weatherable minerals that have been slightly altered or leached (SSSA 1997). Within the analysis area, the Inceptisol soils typically have a fine- to fine-loamy-grained soil texture. These soils are well drained and can produce good agricultural crops under proper management (Brady

1990). In the MATL analysis area, Inceptisol soils have formed on alluvial fans, glacial till plains, and hills with slopes less than 45 percent (NRCS 2006a).

Soils in the Vertisol soil order are mineral soils with greater than 30 percent clay. Within the analysis area, the Vertisol soils have formed from finer-grained glacial sediments that were deposited by glacial outwash. These soils can be well drained under proper management, but will form deep wide cracks when dry (SSSA 1997). Vertisol soils in the analysis area typically have a very fine- to fine-grained texture and are found on alluvial fans, glacial till plains, and lake plains with slopes less than 10 percent.

Soil Stability and Erodibility

The stability and potential for erosion of these soils are primarily dependent on the particle size, slope, and potential for mass movement. Fine-grained soils are more susceptible to wind and water erosion than coarser soils, and soils on steep slopes are more prone to erosion than soils located on relatively flat terrain. Steep slopes are also required for the mass movement of soils.

The majority of the MATL analysis area contains relatively flat terrain. Exceptions are the steep slopes associated with the bluffs north of Great Falls and stream banks along the Teton River, Dry Fork of the Marias River, and Marias River. Mass movement of soils is occurring within the analysis area along the Teton River. Areas of highly erodible or unstable soils (soils on slopes greater than 15 percent) within alternative alignments are shown in **Figure 3.2-1**.

Compaction

The degree to which soils may become compacted from farming or construction operations is primarily dependent on the surface soil grain size, the mineral composition of the soil, and the moisture content. Soils with high silt and clay content are more susceptible to becoming compacted than sandy soils under the same moisture conditions. Moist soils are more prone to compaction for all soil texture and mineral types. Dry soils are less susceptible to compaction than wet soils, but dry soils produce more dust that is eroded by wind. Many of the soils within the MATL analysis area have fine-grained surface soil textures and will be prone to compaction by construction equipment, if adequate soil moisture is present. This may be especially true with cement trucks delivering concrete for long-span monopole foundations.

Salinity

Salinity is a measure of the salt content of the soil. Highly saline soils inhibit the growth of vegetation due to the increased osmotic potential exerted by the salts in the soil solution. Revegetation of disturbed areas with highly saline soils may be problematic. Most of the soils within the analysis area have low to moderate salinity and small areas of saline soils could be avoided. Revegetation success should not be influenced by saline soils in the analysis area with the exception of saline seep areas.

Roads and Access

Roads are best constructed on soils with coarse-grained surface soil textures, compared to soils with surface soils with fine-grained textures. Many soils in the MATL analysis area have fine-grained surface soil textures and may not be suitable for building temporary or permanent roads.

Revegetation

The soils within the MATL analysis area are mostly rated fair to good for growing grasses. The reestablishment of range or cropland vegetation on the disturbed lands should be successful if standard fertilization and seeding methods are implemented.

3.2.3 Environmental Impacts

Potential impacts to geologic and soil resources from the four alternatives are described in this section. The difference among action alternatives depends on the competency of the bedrock, soil type, slope, and disturbance activities that would take place at a given location. Resource characteristics that could be affected differently by each action alternative are slope stability (due to mass movement) and soil stability (due to erosion). Increasing the risk of mass movement could not only result in slope instability, but also compromise the integrity of transmission line support poles. Increasing soil erosion could result in the loss of topsoil, reduced effectiveness of vegetation efforts during reclamation, and increased sedimentation to surface water. Increased soil compaction would also reduce the effectiveness of reclamation efforts in the selected alignment.

Other geologic and soil characteristics (seismicity, subsidence, mineral resources, salinity, road substrate material, and compaction) are similar throughout the analysis area. Impacts to (and from) these resources would be the same for all alternatives and are described below.

3.2.3.1 Alternative 1 — No Action

The No Action alternative would not affect geology or soil resources beyond current impacts from farming, road building, and construction activities.

3.2.3.2 Alternative 2 – Proposed Project

Areas within the Alternative 2 alignment that are prone to impacts, including slope stability (due to mass movement in areas underlain by glacial till and shale on a slope), soil stability (due to erosion on slopes), and soil compaction, are shown on **Figure 3.2-1**. Overall, with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to soils and geology under Alternative 2 would be minor and primarily of short duration.

Mass Movement

Mass movement is likely to occur on incised banks and steep slopes primarily where the alternative alignment crosses streams and rivers. Mass movement could result in the shifting or collapse of transmission line poles and would likely contribute to the sediment load of nearby surface water. Mass movement occurs naturally and can be exacerbated by ground disturbance and heavy equipment associated with the construction of the transmission line. The risk for mass movement is greatest in the Black Horse Lake area (milepost 5), the north side of the Teton River (milepost 35 to 40), and at the Marias River crossing (milepost 88 to 91). MATL would implement erosion and sediment control practices as provided in its application (MATL 2006b) and required by the State of Montana (**Appendix F**). Additional mitigation measures may include precision mapping of unstable soils along these segments of the Alternative 2 alignment and providing an alignment wider than 500 feet to allow flexibility in pole placement, so future landslides do not adversely affect the proposed line.

Soil Stability and Erodibility

Areas prone to soil stability and erosion are shown on **Figure 3.2-1**. Soil stability and erodibility are primarily dependent on soil texture, slope, and degree of disturbance. Soils along much of Alternative 2 are fine-grained and are prone to erosion when the vegetative cover is disturbed, which would be primarily during construction activities. The greatest potential for soil erosion for Alternative 2 would be from the construction of access roads along the banks of the Teton and Marias rivers. Implementing soil and erosion control measures would help minimize the formation of gullies.

Compaction

Soils may become compacted under all action alternatives, especially during the construction phase. MATL has committed to stripping topsoil, by sidecast methods, for new access roads and replacing the sidecast soils following construction. MATL has also developed specific mitigation measures for soils, including providing an erosion control plan and implementing best management practices (water bars, drainage contours, straw bales, filter cloth, or similar) for areas with susceptible soils to minimize impacts to soils.

3.2.3.3 Alternative 3 – MATL B

Alternative 3 is 8.3 miles shorter than the Alternative 2 (121.6 miles vs. 129.9 miles) due to more diagonal segments along the entire alignment. The potentials for mass movement and unstable soils are similar to those under Alternative 2, but the lengths of the alignment with the potential for mass movement and the occurrence of unstable soils are less under Alternative 3.

Mass Movement

Mass movement impacts and mitigations would be similar to Alternative 2. The risk for mass movement is greatest within the historic channel of the Teton River (milepost 32 to 34) and at the Marias River crossing (milepost 84 to 85). MATL would implement erosion and sediment control practices as provided in its application (MATL 2006b) and required by the State of Montana draft Environmental Specifications (**Appendix F**).

Soil Stability and Erodibility

Areas prone to soil stability and erosion problems are shown on **Figure 3.2-1**. About 12 miles of Alternative 3 are located on unstable soils on slopes greater than 15 percent. Soil stability and erodibility are primarily dependent on soil texture, slope, and degree of disturbance. Soils along much of Alternative 3 are fine-grained and are prone to erosion when the vegetative cover is disturbed, which would be primarily during construction activities. The greatest potential for soil erosion for Alternative 3 would be from the construction of access roads along the banks of the Teton and Marias rivers. Implementing soil and erosion control measures would help minimize the formation of gullies.

3.2.3.4 Alternative 4 – Agency Alternative

Alternative 4 is 139.6 miles in length, which is about 9.7 miles longer than the proposed Project (129.9 miles). This alternative is composed of 60.9 miles of the Alternative 2 alignment and 78.7 miles of agency-developed alignments that branch off the Alternative 2 alignment. The 78.7 miles of agency alignments were developed to address identified local scoping issues and concerns. The potentials for mass movement and unstable soils are similar to those under Alternatives 2 and 3, but the lengths of the alignment with the potential for mass movement and the occurrence of unstable soils are greater under Alternative 4 primarily due to the alignment of the alternative along the Dry Fork of the Marias River and Marias River.

Mass Movement

Mass movement impacts and mitigations would be similar to Alternative 2. The risk for mass movement is greatest within the historic channel of the Teton River (milepost 36 to 42), along the Dry Fork of the Marias River (milepost 70 to 82), and at the Marias River crossing (milepost 98.5 to 100.5). MATL would implement erosion and sediment control practices as provided in its application (MATL 2006b) and required by the State of Montana (**Appendix F**).

Soil Stability and Erodibility

Areas prone to soil stability and erosion problems are shown on **Figure 3.2-1**. About 24 miles of Alternative 4 are located on unstable soils on slopes greater than 15 percent. Soil stability and erodibility are primarily dependent on soil texture, slope, and degree of disturbance. Soils along much of Alternative 3 are fine-grained and are prone to erosion when the vegetative cover is disturbed, which would be primarily during construction activities. The greatest potential for soil erosion for Alternative 4 would be from the construction of access roads along the banks of the Teton, Dry Fork of the Marias, and Marias rivers. Implementing soil and erosion control measures would help minimize the formation of gullies.

3.3 Engineering and Hazardous Materials

3.3.1 Analysis Methods

Engineering concerns pertain to transmission line support structures and the impacts of these structures associated with crossing contaminated sites, pipelines, other transmission lines, major highways, streams, and rivers.

Analysis Area

The analysis area for engineering and hazardous materials includes the proposed power line alignments, staging locations, and a 1-mile buffer zone on each side of the proposed alignments.

Information Sources

Information for the analysis of engineering resources was obtained from the MATL MFSA application (MATL 2006b). Information sources for hazardous materials in the affected environment included the online U.S. Environmental Protection Agency (EPA) Region 8 Superfund Site Locator (EPA 2006c), the online Montana NRIS (2006b), and field observation of oil and gas extraction operations within the analysis area.

Methods used to analyze the potential impacts of alternatives 2, 3, and 4 included evaluation of proposed alignments with respect to mapped hazardous materials in the analysis area and evaluation of proposed activities with respect to potential use and generation of hazardous materials.

3.3.2 Affected Environment

Proposed Transmission Line Design

The transmission line would be designed, constructed, operated, and maintained in accordance with the NESC, U.S. Department of Labor OSHA Standards, and other guidance as appropriate for safety and protection of human life and the environment.

Federal Superfund Sites

A review of the online EPA Region 8 Superfund Site Locator indicates that there are no federal Superfund (Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA) sites located within the Project area. The closest federal Superfund sites to the project area are the Barker Hughesville historic mining district and the Carpenter-Snow Creek mining district, both of which are on the federal

National Priorities List. Both of these sites are located southeast of Great Falls. Barker Hughesville mining district is 36.2 miles to the southeast of Great Falls. Carpenter-Snow Creek mining district is 46 miles to the southeast of Great Falls.

State Superfund Sites

There are four state Superfund sites located within the Project area. Conrad Refining Company, 1 mile south of Conrad, is an inactive, 9-acre oil refinery, which operated from 1929 to 1941. Refinery operators disposed of sludge in on-site pits. Midwest Refining Company, in Conrad near Front Street and Second Street South, is an inactive, 0.9-acre former oil refinery which was in operation around 1929. Little historic or other information is available about the facility. Union Oil-Cut Bank Refinery (also known as the Flying J Refinery), 3 miles southeast of Cut Bank, is an inactive crude oil refinery and natural gas processing plant which operated from 1937 to 1983. The Carter Oil Company Cut Bank Refinery is located 1 mile west of Cut Bank on the Blackfeet Indian Reservation. The Conrad Refining Company site is within 1,000 feet of the Alternative 2 alignment. The other sites are not affected by any transmission line alignment.

Oil and Gas Operations and Pipelines

Numerous oil and gas fields are located within the northern portion of the analysis area. All action alternatives would traverse areas with operating oil and gas extraction wells, well waste pits, oil and gas storage systems, and pipelines. A variety of pipelines between 8 and 20 inches in diameter occur within or traverse the Project study area including gathering system main lines and transmission/trunk lines. These pipelines are used to transport either crude oil or natural gas. Four major pipelines exist in a broad corridor between the Canadian border and Cut Bank; six major pipelines exist between Cut Bank and Great Falls. With the exception of an Encana Corporation 16-inch natural gas pipeline, which runs from east to west, primary routes for the main transmission/trunk lines generally run south to north and are located in the western portion of the Project study area.

Crude oil pipelines in the analysis area were located based on information provided by several sources including Front Range Pipeline Company, USGS topographic maps, agency field notes from the fall of 2006, review of 2005 aerial photographs, NRIS mapping, and the Montana Board of Oil and Gas Conservation. Crude oil pipeline data contained in the NRIS database (Montana NRIS 2006a), or provided by the above referenced sources include:

- Two Continental crude oil pipelines are located east of Great Falls running northwest approximately parallel to the Proposed Project and alternatives. The pipelines are 12 inches and 18 inches in diameter. These pipelines run from east of Great Falls through

Portage, Cascade County, to Cut Bank and beyond. These pipelines are crossed in the vicinity of Cut Bank by alternatives 2, 3, and 4.

- Two Front Range Pipeline Company 10-inch mainlines, one 6-inch mainline, and one 16-inch mainline start at the U.S.-Canada border and end at the Santa Rita pump station.
- One Front Range Pipeline Company 16-inch mainline that starts at Santa Rita station and ends in Laurel, Montana.
- One Front Range Pipeline Company 8-inch mainline starts at the Santa Rita station and ends at the Cut Bank station.
- One Front Range Pipeline Company 10-inch pipeline that starts at the U.S.-Canada border and ends at the Santa Rita pump station.

Additional smaller natural gas pipelines are likely located within the analysis area and may be crossed by alignments associated with alternatives 2, 3, and 4.

3.3.3 Environmental Impacts

3.3.3.1 Alternative 1 — No Action

The MATL transmission line would not be built. There would be no engineering or hazardous materials concerns if the No Action alternative were selected.

3.3.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Proposed Construction

The 500-foot-wide Alternative 2 alignment would come within 100 feet of an existing pipeline for a total length of 7.0 miles. The Alternative 3 alignment would come within 100 feet of an existing pipeline for a total of 23.7 miles, and the Alternative 4 alignment would come within 100 feet of an existing pipeline for a total of 5.7 miles. No adverse impacts from proximity to pipelines are expected. However, the risk for potential pipeline damage increases with an increase in length of alignment proximal to a pipeline. No short-term adverse impacts would be associated with transmission line construction tasks.

Proposed Operations Maintenance

No long-term adverse impacts would be associated with operation and maintenance of the transmission line. Wood H-frame structures generally require more maintenance than steel structures and have a shorter useful life. Wood H-frame structures should meet the operational life of the proposed transmission line.

Impacts to buried utilities such as pipelines are considered to be of little consequence; however, should the power line be located near and parallel to an existing pipeline, a separation of 0.5 mile would be recommended to minimize electric field effects. Additional discussion on the safety of co-locating a transmission line with a pipeline is provided in Section 3.4.3.

Federal and State Superfund Sites

No federal or state Superfund sites would be affected by any of the proposed alignments.

3.4 Electric and Magnetic Fields

This section describes background information regarding impacts from electric and magnetic fields (EMF) and corona effects, and evaluates the action alternatives for impacts on human health and safety.

Both current and voltage are required to transmit electrical energy over a transmission line. The current, a flow of electrical charge, measured in amperes (A), creates a magnetic field. The magnetic field is expressed in units of milligauss (mG). The voltage, the force or pressure that causes the current to flow, measured in units of volts (V) or thousand volts (kV), creates an electric field. Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure. Any device connected to an electrical outlet, even if the device is not turned on and current is not flowing, will have an associated electric field that is proportional to the voltage of the source to which it is connected. Magnetic fields occur only when current is flowing. Common materials such as wood and metal usually do not shield against magnetic fields.

In recent years the possibility of deleterious health effects from EMF exposure has increased public concern about living near high-voltage lines. The available data have not revealed any conclusive evidence that EMF exposure from power lines poses a hazard to animal or human health. However, while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard and some studies provide preliminary evidence that a linkage may exist between exposure to magnetic fields and childhood leukemia. In light of the present uncertainty, this section contains a summary of the existing credible scientific evidence relevant to evaluating the potential impacts of EMF.

This section also addresses safety considerations in the immediate vicinity of transmission lines. Additionally, the potential for corona effects on the human environment from transmission lines is discussed. Corona is the electrical breakdown of air into charged particles caused by the electrical field at the surface of conductors, the wires that carry electricity. Corona effects are of concern for potential audible noise, interference with radio, television, and other electrical devices, such as Global Positioning System (GPS) equipment, production of visible light, and photo chemical reactions.

3.4.1 Analysis Methods

The EMF effects of the transmission lines were calculated for a range of distances from the transmission line. In general, the farther removed a person is from the transmission line, the lower the EMF strength. A number of different scenarios were tested in the calculations. Because the magnetic field varies with the current carried on the transmission line, magnetic field strength was calculated for the normal anticipated current load of 230 kV per circuit. In the optimized phasing orientation, the phases of the single circuit are offset to minimize the EMF strength. As described in Section 3.4, the focus of EMF health studies and the focus of the following impacts analysis are on magnetic fields, although electric fields are included for completeness.

Since MATL's policy is to minimize EMF exposure levels to the extent practicable, MATL would use the vertical optimized phasing orientation for the single-circuit line. Results from the non-optimized phasing orientation are included for comparison purposes only. The calculations evaluate EMF strength at a range of distances from the centerline of the transmission line, both within and outside the approximate 105 feet safety zone, and for the portion of each span where the conductors are closest to the ground. The magnetic field is expressed in units of mG; the electric field is expressed in units of kV/m.

The potentials for corona effects and effects on safety are also evaluated. The nearest potential receptors to the transmission line based on the proposed and alternative alignment are listed for each alternative, including residences, schools, and commercial establishments.

Analysis Area

Based on the use of the single circuit, H-frame structure transmission line, the analysis area for human health effects from electric and magnetic fields would include the right of way with 30 feet to either side as a safety zone. This totals 105 feet along each alignment. According to the permit to construct, the safety zone can be adjusted if necessary to meet the electric field requirements set forth by the State of Montana of 1 kV/m at the edge of the right of way (safety zone) in residential and subdivision areas.

Information Sources

General EMF data were researched from the American Conference of Governmental Industrial Hygienists, the Institute of Electrical Engineers, the California Department of Health Services, the National Institutes of Health, World Health Organization, journal articles, and the National Institute of Environmental Health Sciences (NIEHS).

3.4.2 Affected Environment

The affected environment is described in terms of both magnetic and electric health concerns.

Magnetic Field Health Concerns

In recent years**,** the focus of the EMF health studies for power lines has been on the magnetic fields created by the power lines. These studies investigated the potential that EMF exposure will increase the risk of cancer, leukemia, miscarriages, and other diseases.

A 60-Hertz (Hz) magnetic field is created in the space around transmission line conductors by the electric current flowing in the conductors. This is the frequency of ordinary household current, usually referred to as 60 cycle. The strength of the magnetic field produced by an electric transmission line depends on the electrical load, the configuration of the conductors (spacing and orientation), the height of the conductors, the distance from the line, and the proximity of other electrical lines. As the load on a transmission line varies continually on a daily and seasonal basis, the magnetic fields likewise vary throughout the day and year. Magnetic fields are highest closer to the line and diminish with distance. Physical structures, such as buildings, are transparent to magnetic fields created by power lines, thus fueling the interest in potential health effects.

Existing EMF levels in the project vicinity are primarily dominated by EMF from common household appliances. EMF levels of some common household appliances are listed in **Table 3.4-1**. This table shows that the magnetic fields at a distance of 3 feet range from less than 0.1 mG to 18 mG.

TABLE 3.4-1
EMF LEVEL OF SOME COMMON HOUSEHOLD APPLIANCES

Appliance	Magnetic Field at 3 feet (mG)
Clothes dryers	0.0 to 1
Clothes washers	0.2 to 0.48
Electric shavers	Less than 0.1 to 3.3
Fluorescent desk lamp	0.2 to 2.1
Hair dryers	Less than 0.1 to 2.8
Irons	0.1 to 0.2
Portable heaters	0.1 to 2.5
Television	Less than 0.1 to 1.5
Toasters	Less than 0.1 to 0.11
Vacuum cleaners	1.2 to 18.0

Notes:
EMF = electric and magnetic field
mG = milligauss
Source: Waveguide 2003

Existing transmission and distribution lines also contribute to EMF levels. **Figure 3.4-1** shows the existing 115-kV transmission lines in the project vicinity. As an example of maximum existing EMF, MATL has modeled EMF levels from the existing 115-kV transmission lines that run through the proposed project area. At a distance of 49 feet from the existing 115-kV transmission line (which coincides with the proposed location of MATL's new transmission line), the magnetic field is 6.5 mG and the existing electric field is 1.75 kV/m. At a distance of 200 feet from the existing 115-kV transmission line (which coincides with the edge of the safety zone of MATL's proposed transmission line), the magnetic field is 0.4 mG and the electric field is 1.06 kV/m. The existing EMF level at the edge of the proposed safety zone is expected to be below an average daily exposure to magnetic fields from some common household appliances (approximately 0.8 mG) (NIEHS 1999).

No Federal or state regulations are in effect specifying environmental limits on the strengths of magnetic fields from power lines. However, the state of Montana has adopted an electric field exposure value of 1 kV/m edge of right-of-way standard in residential and subdivided areas unless waived by the landowner and a 7 kV/m standard for road crossings. Some non-governmental organizations have set advisory limits on EMF as a precautionary measure, based on the knowledge that high field levels (more than 1,000 times the EMF found in typical environments) may induce currents in cells or nerve stimulation. The International Commission on Non-Ionizing Radiation Protection has established a continuous electric field exposure limit of 4.2 kV/m, and a continuous magnetic field exposure limit of 833 mG for members of the general public (NIEHS 2005).

Electric Field Health Concerns

Safety considerations in the immediate vicinity of electric power lines include the potential for electric shock, the clearance of the power lines above ground, measures to prevent unauthorized climbing of the poles, and the proximity of the transmission lines to other utilities such as oil wells and pipelines.

The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, towers, vegetation, buildings, vehicles, and persons. Potential field effects can include induced currents, steady-state current shocks, spark discharge shocks, and in some cases field perception and neurobehavioral responses.

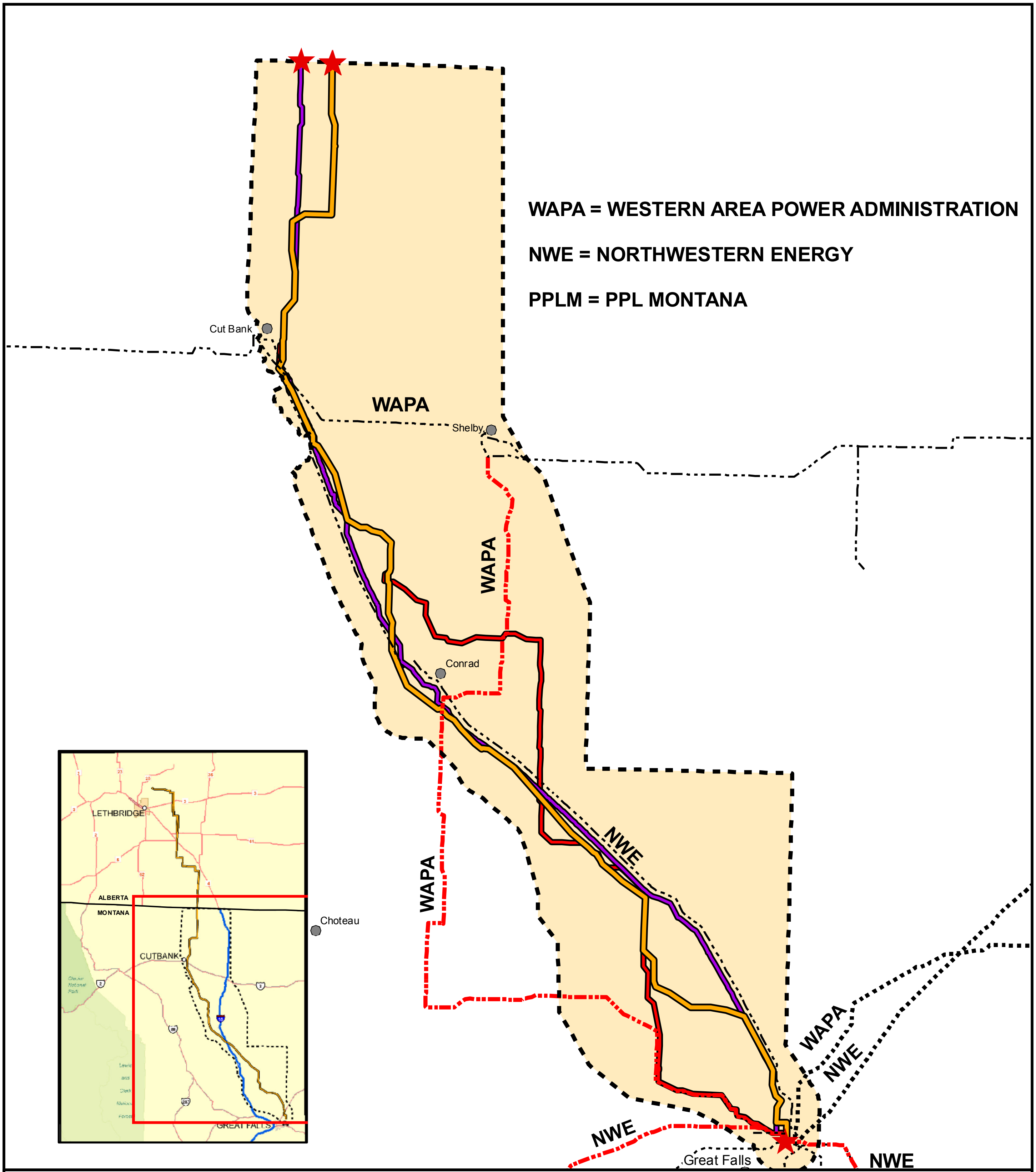

WAPA = WESTERN AREA POWER ADMINISTRATION
NWE = NORTHWESTERN ENERGY
PPLM = PPL MONTANA
Cut Bank
WAPA
Shelby
WAPA
Conrad
NWE
WAPA
Choteau
WAPA
NWE
NWE
NWE
Great Falls
LETHBRIDGE
ALBERTA
MONTANA
CUTBANK
GREAT FALLS

FIGURE 3.4-1
EXISITNG TRANSMISSION LINES LARGER THAN 69kV IN PROJECT VICINITY

LEGEND

230kV POWERLINE	ALT2 - ALIGNMENT
161kV POWERLINE	ALT3 - ALIGNMENT
115kV POWERLINE	ALT4 - ALIGNMENT
100kV POWERLINE	
● CITIES AND TOWNS	
★ ALIGNMENT END AND EXIT POINTS	
STUDY AREA	

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_4-1_MATL_Transmission_Lines_letter_012207.mxd

Sparking and Shocks

In a high electric field, it is theoretically possible for a spark discharge from the induced voltage on a large vehicle to ignite gasoline vapor during refueling. However, the probability for the precise conditions to occur for ignition is extremely remote. According to the Conrad-Shelby EIS (DOE 1986), the ignition of fuel under a transmission line would require that an individual be standing on damp earth or vegetation and that the vehicle to be refueled must be exposed to the maximum intensity of the electric field. The vehicle must also be insulated. Finally, the air-fuel mixture must approach optimal flash-point conditions. Therefore, the number of precise conditions to be met to achieve fuel ignition reduces the likelihood of the occurrence. In the event fueling is to be done under a power line, grounding is recommended.

Short Circuit Currents

When a conducting object, such as a vehicle or person, is placed in an electric field, currents and voltages are induced. Some representative short-circuit currents in undisturbed electric fields of 1 kV/m and 3.5 kV/m are provided in **Table 3.4-2**.

TABLE 3.4-2
SHORT CIRCUIT CURRENTS FOR VARIOUS OBJECTS
IN MILLIAMPERES (MA)

	Electric Field	
Object	**1 kV/m**	**3.5 kV/m**
Person (5′8″ tall)	0.016	0.06
Cow	0.024	0.08
Sedan	0.11	0.40
Camper truck (28′long)	0.28	1.00
Large trailer-truck (65x8.5x13.5)	0.93	3.30
Large haystacker and 4wd tractor	0.89	3.10
3- strand fence (200′ long)	0.30	1.10

Source: Conrad –Shelby Transmission Line EIS (DOE 1986)

Based on the length requirements set forth by the U.S. Department of Transportation, the longest permitted truck in Montana is 65 feet. This is also the longest anticipated vehicle under the proposed transmission line with a short-circuit current of 0.93 milliampere (mA)/kV/m. Large farm equipment, such as hay wagons, sprayers, and combines, would also have large short-circuit currents but would not exceed the NESC criterion of 5 mA. Therefore, under worst case scenario conditions the short circuit current to the largest anticipated vehicle is 3.3 mA, which is less than the NESC criterion of 5 mA. The maximum height of a vehicle or piece of equipment passing under a transmission line should not be higher than 14 feet (NESC). If a person provides the only conducting path from the object to the ground, then the currents listed in **Table 3.4-2** flow through the person, when the person touches the object and the object is below the line. Based on the action alternative descriptions, all equipment being operated around the transmission line should be properly grounded. In summary, electric field health concerns are:

- *Steady-State Current Shock* – Steady-state currents are those that flow continuously after a person contacts an object, such as a vehicle, and provides a path to ground for the induced current. The effects of these shocks range from involuntary movement in a person to direct physiological harm. Steady-state current shocks occur in instances of direct or indirect human contact with an energized transmission line. An example of indirect steady-state current shock would be similar to the incident that occurred when a young farm worker touched a grain auger to a transmission line while in contact with the auger. Based on the investigations by NIOSH following the incident, the current entered the worker through his hands and exited through his left foot. The worker therefore became the exit point for the steady state current. Injuries are more likely to result with lower voltage power lines than in higher voltage lines because contact is more likely. The electrical conductors of lower voltage lines are closer to the ground, smaller, and less noticeable.
- *Spark-Discharge Shocks* – Induced voltages appear on objects such as vehicles when there is an inadequate ground. If the voltage is sufficiently high, a spark-discharge shock will occur as contact is made with the ground. Spark-discharge shocks that create a nuisance occur in instances of carrying or handling conducting objects, such as irrigation pipe, under (not touching) transmission lines.
- *Field Perception and Neurobehavioral Responses* – When the electric field under a transmission line is sufficiently strong, it can be perceived by hair raising on an upraised hand. This is the effect of harmless levels of static electricity, similar to the effect of rubbing stocking feet on a carpet.

Other Health Concerns

An additional safety concern in the immediate vicinity of electric power lines is the potential for people to climb poles and either fall or receive a serious shock. Poles can be designed in a manner to prevent the unauthorized climbing of the poles by members of the public. With the increasing trend of large farm equipment, sufficient clearance height must be considered to avoid contact with the lines either directly or indirectly, as provided by the National Electric Safety Code.

Smoke can also be a conductor of electrical current. When a fire is in the vicinity of a 230-kV transmission line, the transmission line could start fires outside the fire perimeter. Current could potentially arc through the smoke shocking firefighters in the vicinity.

Corona Effects

Corona is the electrical breakdown of air into charged particles caused by the electrical field at the surface of conductors. Corona is of concern for potential audible noise (60-cycle hum), radio, television, and GPS interference, visible light, and photochemical reactions. Corona can occur on the conductors, insulators, and hardware of an energized high-voltage transmission line. Corona on conductors occurs at locations where the field has been enhanced by protrusions, such as nicks, insects, or drops of water. During fair weather, the number of these sources is small and the corona effect is insignificant. However, during wet weather, the number of these sources increases and corona effects are much greater (DOE 2001). Corona effects of concern are listed below.

- *Audible Noise* – Corona-generated audible noise from transmission lines is generally characterized as a cracking/hissing noise. The noise is most noticeable during wet weather conditions. Audible noise from transmission lines is often lost in the background noise at locations beyond the edge of the right of way. Refer to Section 3.12 for a description of existing noise in proposed project area.
- *Radio, Television, and GPS Interference* – Corona-generated radio interference is most likely to affect the amplitude modulation (AM) broadcast band (535 to 1,605 kilohertz); frequency modulation (FM) radio is rarely affected. GPS units are operated at frequencies of 1575.42 megahertz (MHz) and 1227.6 MHz (Enge and Hatch 1996) and no interference is expected with the 60 Hz frequency associated with transmission lines. Only AM receivers located very near to transmission lines have the potential to be affected by radio interference. The potential for interference from corona effects is more severe during damp or rainy weather.
- *Visible Light* – Corona may be visible at night as a bluish glow or as bluish plumes. On the transmission lines in the area, the corona levels are so low that the corona on the conductors usually is observable only under the darkest conditions with the aid of binoculars.
- *Photochemical Reactions* – When coronal discharge is present, the air surrounding the conductors is ionized and many chemical reactions take place producing small amounts of ozone and other oxidants. Approximately 90 percent of the oxidants is ozone, while the remaining 10 percent is composed principally of nitrogen oxides. Refer to Section 3.11 for a description of existing air quality.

3.4.3 Environmental Impacts

This section discusses the potential human health and environment effects of the proposed project. Potential impacts on human hearing are addressed in Section 3.12, Noise.

3.4.3.1 Alternative 1 – No Action

Under the No Action alternative, MATL would not build the proposed transmission line and associated facilities as proposed. There would be no EMF exposure associated with the project. EMF exposure from existing transmission lines and household appliances would be expected to continue. There would be no corona effects associated with the project. There would be no associated safety issues regarding co-location with a natural gas or oil pipeline.

3.4.3.2 Alternative 2 – Proposed Project

Electric and Magnetic Field Effects. Alternative 2 would use single-circuit, H-frame structures, with two overhead shield wires. Three-pole structures would be used at medium and heavy angles, and dead ends, strung with 230-kV conductors. The spacing of the structures would be in the range of 500 to 1,600 feet apart and the conductors would be 21 feet above the ground. The minimum ground clearance of the conductors set forth in the National Electric Safety Code is 19.72 feet; therefore some additional ground clearance would help diminish the potential for induced current exposure.

Table 3.4–3 lists the EMF strength under normal anticipated load conditions for the 230-kV single-circuit transmission line using H-frame structures. For comparison, the EMF field strengths are also provided for monopole structures. There is a maximum thermal capacity of 420 megavolt amperes. EMF strength is given for normal operating configurations that would be used by MATL. The electric field strengths and magnetic field strengths under normal operating conditions optimized phasing for transmission lines (H-frame structures) are shown in **Figure 3.4-2** and **Figure 3.4-3**, respectively (SNC-LAVALIN 2006). The distances given represent the distance of a receptor from the centerline of the transmission line and one meter above the ground. At a given distance, the electric and magnetic field strength would be nearly identical on both sides of the transmission line.

TABLE 3.4-3
EMF EFFECTS

Structure Type	Location	Distance from Center Line (feet)	Electric Field (KV/m)	Magnetic Field (mG)
H-frame NESC Ground Clearance: 19.72 ft.	Below Conductor	20	5.7	262
	Right of Way Edge	52.5	1.7	62
	Alignment Edge	250	0.01	3.8
Monopole NESC Ground Clearance: 19.72 ft.	Below Conductor	10	5.0	175
	Right of Way Edge	52.5	0.8	37
	Alignment Edge	250	<0.01	<3.8

Note: Estimates calculated using Corona and Field Effects Program (Kingery 1991), and based on conductor ground clearance of 19.72 feet (NESC specification).
kV/m = kilovolts per meter
mG = milligauss

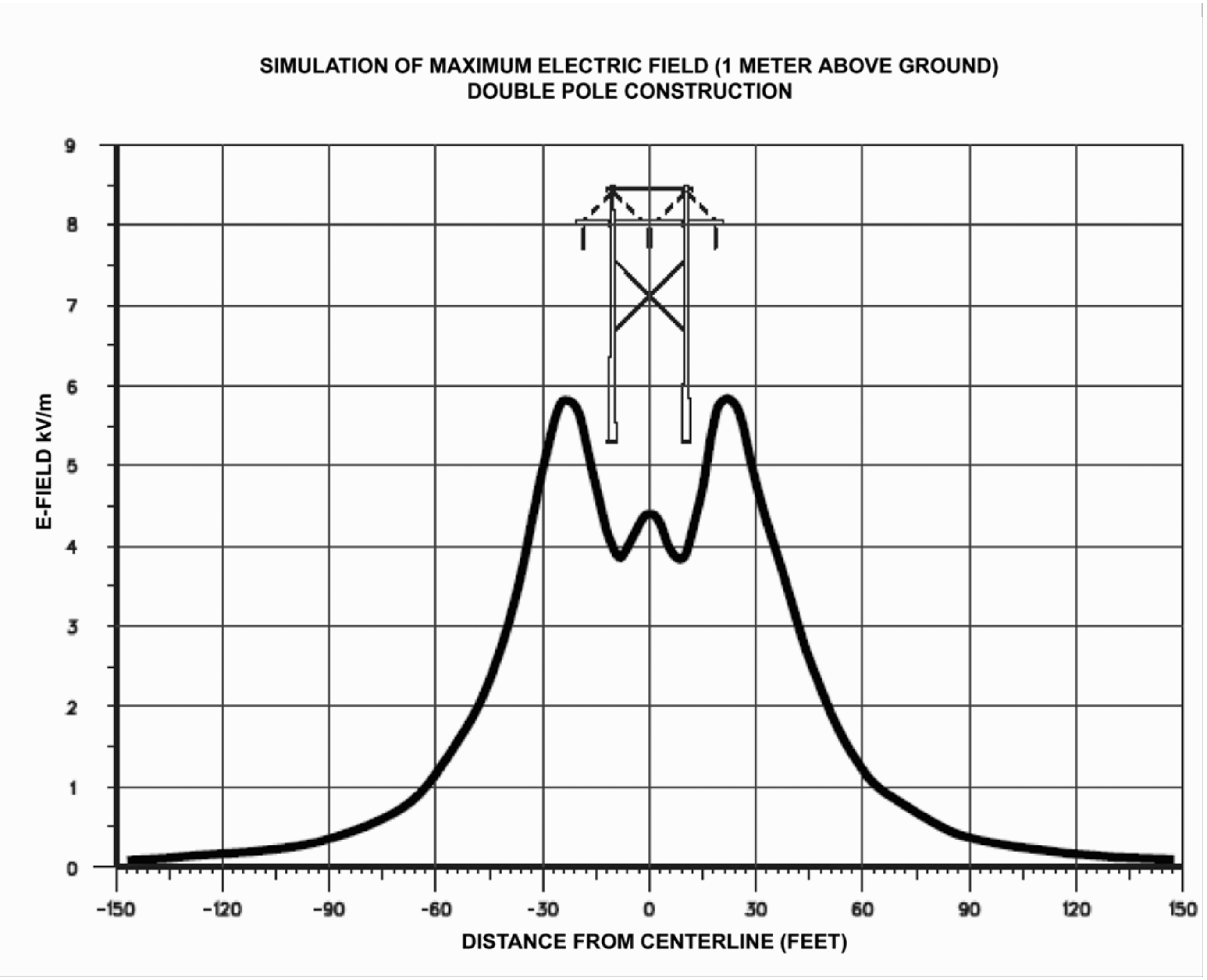


FIGURE 3.4-2
PROPOSED MATL POWERLINE ELECTRIC FIELD STRENGTH FOR NORMAL OPERATING CONDITIONS, OPTIMIZED PHASING

E-Field - Electric Field
kV/m - Kilovolts per Meter

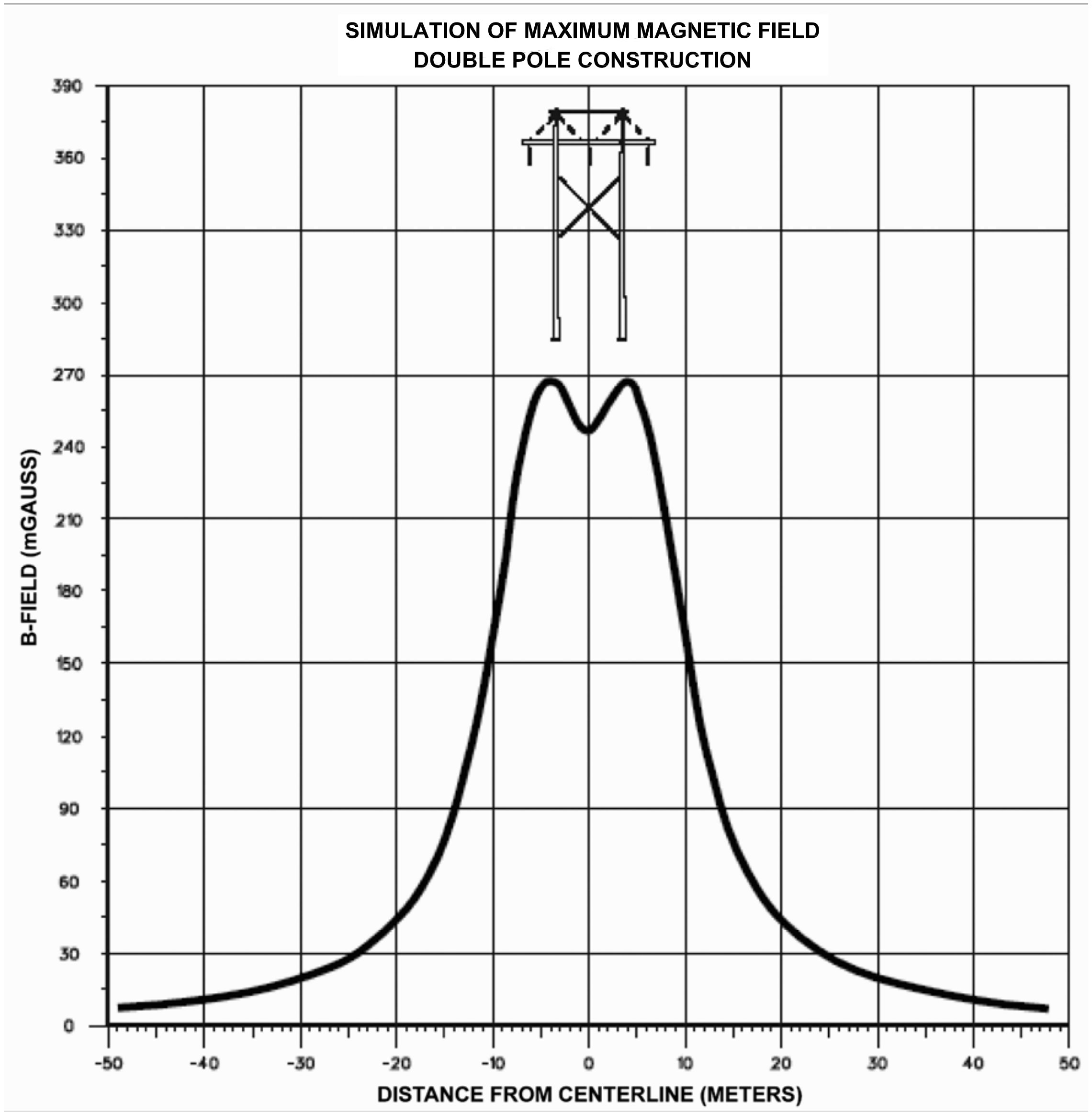


FIGURE 3.4-3
PROPOSED MATL POWERLINE MAGNETIC FIELD STRENGTH FOR NORMAL OPERATING CONDITIONS, OPTIMIZED PHASING

B-Field - Magnetic Field
mGAUSS - Milligauss

EMF effects are presented in **Table 3.4–3.** Two shield wires, which provide necessary shielding for lightning protection, would be placed near the top of each pole to shield the 230-kV phase subconductors. Each circuit of a single-circuit transmission line consists of three phases; each phase consists of two subconductors.

Long-term electric field exposure at the nearest residences to Alternative 2 (located within 300 feet of the line) would be below the state of Montana 1 kV/m standard at the edge of the right of way and the 0.8 mG of average daily exposure to maximum magnetic fields from some common household appliances (NIEHS 1999). The EMF strengths conform to those normally found in comparable lines. Schools and commercial establishments would be located farther from the transmission line. The closest schools to the transmission line would be Glacier Elementary at 0.86 mile to the west of Alternative 2, and Conrad Christian School at 0.4 mile to the northeast of Alternative 3.

Safety. As described in Section 3.4.2, the electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, towers, vegetation, buildings, vehicles, and people. Potential field effects can include induced currents, steady-state current shocks, spark discharge shocks, field perception and neurobehavioral responses and smoke and fire. The following describes the potential for effects on safety, and design mitigation measures that would be incorporated.

Induced Currents. The 230-kV transmission line would have a minimum ground clearance of 21 feet to reduce the potential for induced current shocks. In addition, permanent structures in the safety zone, such as fences, gates, and metal buildings would be grounded.

Steady-State Current Shocks. Features reducing the level of potential for induced current in objects near the transmission line also reduce the level of a possible induced current shock. The proposed lines would be constructed in accordance with industry and MATL standards to minimize hazardous shocks from direct or indirect human contact with an overhead, energized line. These lines are expected to pose minimal hazards to humans.

Spark Discharge Shocks. In accordance with MATL's transmission line standards, the magnitude of the electric field would be low enough that spark discharge shocks would occur rarely, if at all. The potential for nuisance shocks would be minimized through standard grounding procedures. Carrying or handling conducting objects, such as irrigation pipe, under transmission lines can result in spark discharges that are a nuisance. The primary hazard with irrigation pipes or any other long objects, however, is electrical flashover from the conductors if the section of pipe is inadvertently tipped up near the conductors. In order to minimize these effects, the transmission lines would be constructed with adequate ground clearance and any pipelines would be properly grounded. The use of farm augers under power lines should be conducted using the guidelines presented by the Occupational Health and Safety Administration (OSHA). As a general rule, when handling farm equipment of any type around power lines, one should stay 10 feet away on all sides (360 degrees).

Field Perception and Neurobehavioral Responses. Perception of the field associated with the transmission lines would not be felt beyond the edge of the safety zone. Persons working in the right of way might feel the field. Studies of short-term exposure to electric fields have shown that fields may be perceived (for example, felt as movement of arm hair) by some people at levels of about 2 to 10 kV/m, but studies of controlled, short-term exposures to even higher levels in laboratory studies have shown no adverse effects on normal physiology, mood, or ability to perform tasks (DOE 2001a). The International Commission on Non-Ionizing Radiation Protection Guidelines recommend that short-term exposures be limited to 4.2 kV/m for the general public. The exposures associated with the proposed Project are below this recommended limit, reaching a maximum of less than 1.5 kV/m within the safety zone (International Commission on Non-Ionizing Radiation Protection 2003).

The monopole steel structures that would be used are non-climbable. The ground clearance of the conductors would be a minimum of 21 feet, adequate clearance for safety considerations as related to most recreational activities.

Smoke and Fire. When a fire is in the vicinity of a 230-kV transmission line, firefighters would monitor smoke near the transmission line for possible fire starts outside of the fire perimeter. Firefighters would remain at a distance that would not leave them vulnerable to the electric current or shock.

Corona Effects. Corona is the electrical breakdown of air into charged particles caused by the electrical field at the surface of conductors. As described in Section 3.4.2, corona is of concern for potential audible noise, radio, television, and GPS interference, visible light, and photochemical reactions.

Audible Noise. Noise levels generated by the transmission lines would be greatest during damp or rainy weather. For the proposed lines, low-corona design established through industry research and experience would minimize the potential for corona-related audible noise. The proposed lines would not add substantially to existing background noise levels in the area. Research by the Electric Power Research Institute (1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-foot safety zone. During rainy or damp weather, an increase in corona-generated audible noise would be balanced by an increase in weather-generated noise.

For additional assessment of the noise from the proposed Project and alternatives, refer to Section 3.12.

Radio, Television, GPS Interference. Transmission line-related radio-frequency interference is one of the indirect effects of line operation produced by the physical interactions of transmission line electric fields. The level of such interference usually depends on the magnitude of the electric fields involved. The line would be constructed according to industry standards, which minimize the potential for surface irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware and other irregularities around the conductor surface that would increase corona effects. However, if such corona interference were to be generated, no interference-related complaints would be expected given the distance of residents from the transmission lines. Federal Communications Commission regulations require each project owner to ensure mitigation of any such interference to the satisfaction of the affected individual. Typical mitigation measures include: cleaning insulators, tightening line hardware, inspecting conductor surface for irregularities, relocating antennas, installing high-gain or directional antennas, connecting to a cable system or installing a translator station.

Power lines can affect the radio frequency of each GPS receiver. Manufacturers have different methods of shielding GPS signals; therefore, each receiver will react differently in the environment surrounding power lines. Damaged power lines may cause interference with GPS signals.

Visible Light. The corona levels associated with the proposed transmission lines would be similar to those of existing transmission lines. The visible corona on the conductors would be observable only under the darkest conditions with the aid of binoculars.

Photochemical Reactions. The maximum incremental ozone levels at ground level produced by corona activity on the proposed transmission lines would be similar to those produced by the existing lines in the area. During damp or rainy weather the ozone produced would be less than 1 part per billion. This level is low when compared to natural levels and their fluctuations (DOE 2001a).

Corona would be mitigated by using proper line design and by incorporating line hardware shielding. The design of electrical hardware and equipment considers the potential for corona effects.

Safety of Co-locating a Transmission Line and a Pipeline. There are a number of potential safety issues associated with constructing a transmission line near a buried natural gas or crude oil pipeline, related to electrical shock hazard and natural gas pipeline leaks and fire or explosion hazards should a natural gas leak occur.

A buried pipeline that shares an alignment with an alternating current transmission line, such as the one proposed for the project, could become energized by the EMF surrounding the power system in the air and soil. This alternate current interference may result in an electrical shock hazard for people touching the pipeline or metallic structures connected to the pipeline, and may cause damage to the pipeline coating, insulating flanges, or even damage to the pipeline's wall itself (Dawalibi 2004). However, the natural gas or oil pipelines would not carry electricity or otherwise present a shock hazard to residential gas users.

The transmission line would cross over several pipelines. Therefore, where feasible, a minimum distance of 132 feet from any above ground structures such as wellheads, would be maintained between the proposed transmission line and the edge of an existing pipeline right of way or the pipe itself. Additional mitigation measures include grounding mats, gradient wire controls, gradient control mats or grids and/or the installation of a cathodic protection system to the pipelines to minimize shock hazard and damage to the pipelines. MATL would consult with pipeline owners about the proposed project and once an exact location for the structures is determined, MATL would implement the appropriate mitigation measure. In addition, the transmission line would comply with all Federal and State regulations concerning co-locating a transmission line near a buried gas pipeline (Dawalibi 2004).

There are potential safety issues associated with construction and maintenance vehicles driving over any gas or oil pipelines. MATL would consult with any pipeline owner after final siting of the transmission line structures regarding this issue.

3.4.3.3 Alternatives 3 and 4 – MATL B and Agency Alternative

Alternatives 3 and 4 would also involve the construction of 230-kV single-circuit transmission lines. **Table 3.4-3** lists the EMF strength under normal anticipated load conditions for the 230-kV single-circuit transmission lines. **Figures 3.4-2** and **3.4-3** graphically illustrate the electric and magnetic field strengths, respectively, for the optimized phasing configuration of the transmission lines. The distances given represent the distance of a receptor from the centerline of the transmission line. At a given distance, the EMF strength would be nearly identical on both sides of the transmission line safety zone. Impacts described in Alternative 2 would be the same under Alternatives 3 and 4.

3.5 Water Resources

3.5.1 Analysis Methods

Surface water resources in the study area were evaluated using a GIS analysis for each alternative to identify locations where an alignment could cross a water body. For this evaluation it was assumed that:

- Disturbance for each alternative alignment could be within 250 feet to either side of the reference centerline.
- The probability for temporarily increasing sources of sediment to surface water is proportional to the number of water body crossings.

In addition, none of the action alternatives propose any beneficial use of groundwater. Furthermore, no project element has been identified that could possibly affect groundwater quality. Therefore, groundwater resources are not considered for impact analysis.

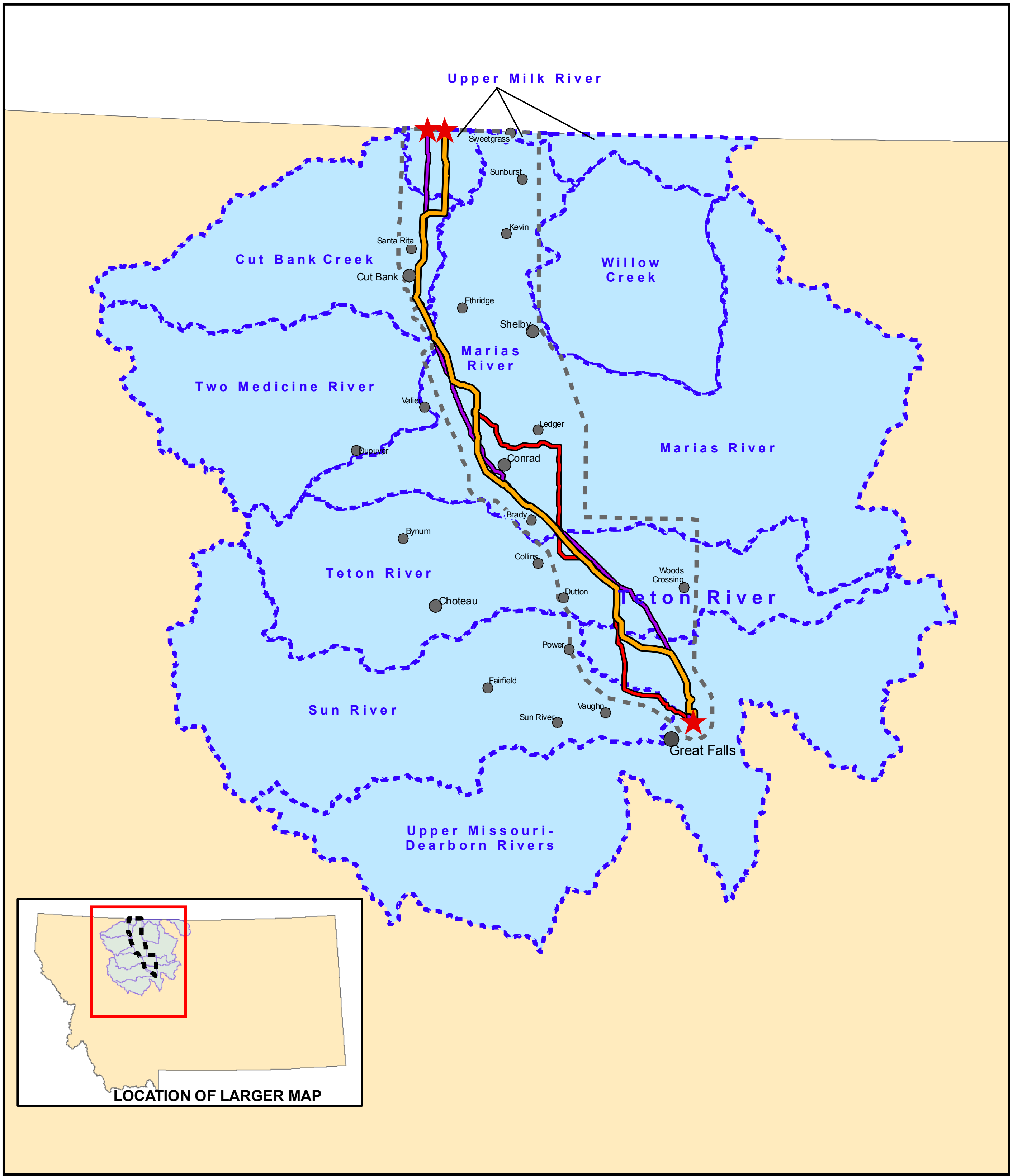
Information Sources

Data on water resources in the analysis area were obtained from a variety of sources including literature review, reports from the Montana Natural Heritage Program (NHP), the DEQ 2006 Integrated 303(d)/305(b) Water Quality Report, Federal Emergency Management Agency (FEMA), Flood Insurance Rate Maps, the Montana NRIS, and the MFSA application (MATL 2006b). Surface water flow and quality information were obtained from the USGS, the MBMG, and DEQ. To the degree possible, information was verified by ground reconnaissance during a team field trip May 17-18, 2006.

Analysis Area

The water resources analysis area is the same as the study area and encompasses about 2,260 square miles in northcentral Montana from the Montana-Alberta border to the Great Falls area (**Figure 1.1-1)**. This region includes portions of eight hydrologic subbasins in Montana, all of which contribute to the lower Missouri River Basin (**Figure 3.5-1)**.

The primary surface water features in the analysis area are Cut Bank Creek, the Marias River and the Dry Fork Marias River, Pondera Coulee, the Teton River, Benton Lake, Hay Lake, and the Missouri River. Isolated prairie potholes, lakes, and stock reservoirs are scattered throughout the analysis area.



Upper Milk River
Sweetgrass
Sunburst
Kevin
Santa Rita
Cut Bank Creek
Cut Bank
Willow Creek
Ethridge
Shelby
Marias River
Two Medicine River
Valier
Ledger
Marias River
Dupuyer
Conrad
Brady
Bynum
Collins
Teton River
Woods Crossing
Dutton
Choteau
Teton River
Power
Fairfield
Sun River
Sun River
Vaughn
Great Falls
Upper Missouri-Dearborn Rivers
LOCATION OF LARGER MAP

FIGURE 3.5-1
WATERSHEDS INTERSECTING THE STUDY AREA

LEGEND

▨ MAJOR WATERSHEDS
● CITIES AND TOWNS
★ ALIGNMENT END AND EXIT POINTS
⬚ STUDY AREA BOUNDARY

— ALT2 - ALIGNMENT
— ALT3 - ALIGNMENT
— ALT4 - ALIGNMENT

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_5-1_MATL_Water_Study_Area_letter_012207.mxd

3.5.2 Affected Environment

The water resources analysis area is generally one of low topographic relief, low precipitation, and agricultural vegetation types. Elevations range from 4,372 feet above sea level in the northwest corner of the analysis area to about 3,016 feet above sea level on the Missouri River in the southeast corner of the analysis area.

Precipitation and Recharge

The region is semi-arid and precipitation patterns do not vary widely throughout the analysis area. Average annual precipitation varies from 11.6 inches per year near Cut Bank to 15.2 inches per year near Great Falls (Western Regional Climate Center [WRCC] 2006). Winters can be extremely cold with desiccating winds and snow. May and June are the wettest months; however, perennial streams and rivers are sustained primarily from moisture derived from mountain snowpack.

Activities that Affect Resource Conditions

Water resources of the analysis area, including both surface water and groundwater, are affected directly or indirectly by human activities such as irrigation, livestock use, industry, oil and gas development, domestic consumption, and to a lesser extent by recreation and transportation. These interdependencies can affect human health, wildlife, engineered structures, and economics of the region. The primary beneficial uses of water in the analysis area include agriculture, support of domestic activities, and fish and aquatic life.

Water Quality

No specific areas of water quality problems have been recorded for water in the analysis area other than impaired water bodies identified by DEQ. The U.S. Clean Water Act Section 303(d) requires that each state submit a biennial report to the EPA that identifies water bodies that are water quality limited. The resulting 303(d) list provides the basis for systematically tracking state waters that do not meet water quality standards. Streams and rivers designated as 303(d) or impaired streams in the analysis area are: Old Maids Coulee (an intermittent stream), Pondera Coulee, Cut Bank Creek, Marias River, Teton River, Lake Creek, and the Missouri River. The 303(d) streams are shown on **Figure 3.5-2.** The Marias River is expected to be delisted in early 2007, and Benton Lake is listed as "impaired." Summary sheets describing the impaired river segments, the type of impairment, and the cause of the impairment are provided in **Appendix I**.

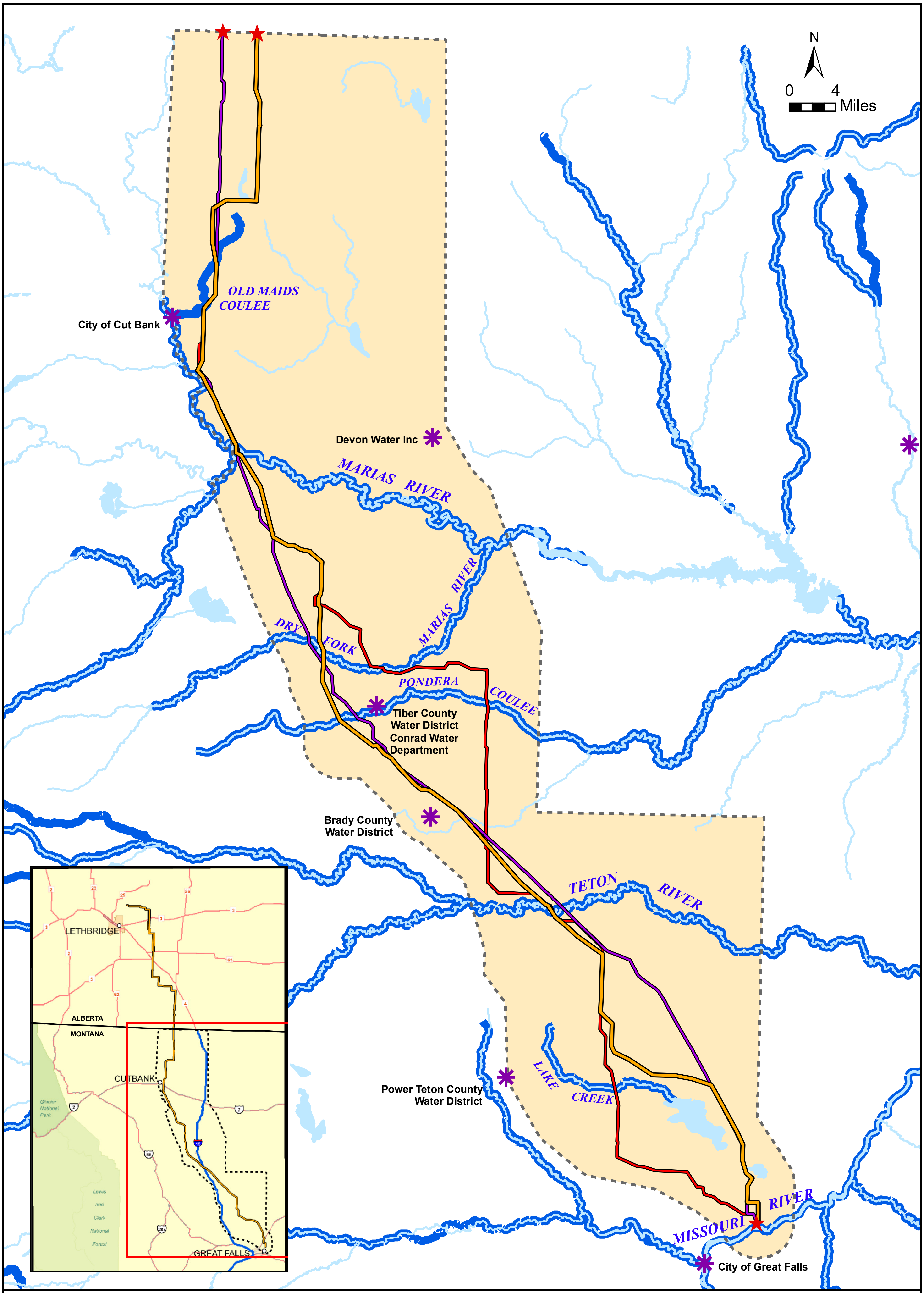

N
0 4 Miles
OLD MAIDS COULEE
City of Cut Bank
Devon Water Inc
MARIAS RIVER
MARIAS RIVER
DRY FORK
PONDERA COULEE
Tiber County Water District
Conrad Water Department
Brady County Water District
TETON RIVER
LAKE CREEK
Power Teton County Water District
MISSOURI RIVER
City of Great Falls
LETHBRIDGE
ALBERTA
MONTANA
CUTBANK
GREAT FALLS
Glacier National Park
Lewis and Clark National Forest

FIGURE 3.5-2
HYDROLOGIC FEATURES AND WATER QUALITY

LEGEND

- ✳ MUNICIPAL POTABLE WATER SOURCE (DEQ)
- RIVERS AND STREAMS
- IMPAIRED 303(d) STREAMS
- LAKES AND PONDS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA
- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_5-2_MATL_Water_Quality_012207.mxd

Water Rights

Existing water rights would not be affected by the proposed Project.

Surface Water

The analysis area is located within the Missouri-Marias watershed subregion in west central Montana. Portions of the analysis area fall within one or more of the following 4th level hydrologic unit codes (HUC): Upper Milk River, Cut Bank Creek, Marias River, Two Medicine River, Willow Creek, Teton River, Sun River and Upper Missouri-Dearborn rivers (USGS 2006a). Surface water flow data presented herein were retrieved from the USGS website (USGS 2006c).

One water body within the analysis area has been identified by the FWP as a blue ribbon or red ribbon fishery river depending on the stream reach (Missouri River). The locations at which all three alternatives cross the Marias and Teton rivers are considered habitat class 3 and sport class 4 fisheries. Some streams in the analysis area are perennial (typically have surface flow throughout the year). These streams are shown on **Figure 3.5-2**. However, most other streams in the analysis area are either ephemeral (flow only in response to snowmelt or rainfall) or intermittent (flow only in response to groundwater recharge and precipitation). Numerous intermittent streams, lakes, reservoirs, and prairie potholes are also present within the analysis area.

A summary of surface water resources and water quality in the analysis area organized by HUC is provided in **Appendix J**. Surface water quality is also summarized on **Figure 3.5-2**.

Lakes and Reservoirs

The analysis area contains a number of lakes and reservoirs; however, there are some portions of the analysis area that are nearly devoid of lakes, such as the area between Benton Lake and the Teton River.

All surface water bodies with areas at least 5 acres in size and crossed by an alternative alignment are presented on **Figure 3.5-2.** The largest of these water bodies is Benton Lake, which is located in the southeastern portion of the analysis area. Benton Lake is a glacially formed 5,000-acre shallow wetland. Other large lakes include Aloe Lake and Hay Lake, both of which are located north of the Marias River. Numerous smaller lakes are found throughout the area. **Appendix J** lists the lakes in the analysis area that are at least 20 acres in size and all lakes greater than 5 acres that are crossed by one of the action alternatives.

Municipal Water in the Analysis Area

Most of the municipal watersheds serve as groundwater sources for one or more communities, while a smaller number serve as surface water sources. Municipal watersheds with potable surface water bodies include the Cut Bank Watershed (Cut Bank Creek) and the Marias Watershed.

There are six water districts within the analysis area that rely on surface water for potable water. These include Cut Bank, Devon Water, Inc., Tiber County Water District (Conrad Water Department), Brady County Water District, Power Teton County Water District, and the City of Great Falls.

3.5.3 Environmental Impacts

Water resources and associated infrastructure that potentially could be affected by the proposed project include perennial streams and rivers, ephemeral and intermittent drainages, floodplains, irrigation ditches and canals. Temporary impacts to water are categorized as lasting less than 30 days, short-term impacts are less than 1 year, and long-term impacts are greater than 1 year. Adverse impacts to water (if they occur) would be considered major if they meet one or more of the following criteria:

- If the expected water use would exceed the capacity of the potable water system for a community or individual.
- If the quantities of stream flow affecting downstream beneficial uses would be altered.
- If groundwater withdrawals would affect either the quantity or quality of existing water supply wells within a 1-mile radius of the proposed withdrawal location.
- If stream bank disturbance would result in pronounced sedimentation or if disturbance would cause streambed erosion or sedimentation.
- If wastewater discharge would result in erosion contributing to sedimentation in surface water.
- If an alternative would result in a reduction in the quantity or quality of water resources to below Montana water quality standards or in violation of a TMDL plan for existing or potential future uses.
- If the proposed Project or alternatives would cause substantial flooding or erosion, or subject people or property to flooding or erosion.

All project alternatives were evaluated to identify adverse impacts to water resources using the above criteria. No major impacts to water resources are predicted for any of the action alternatives. The only minor issue is the potential for soil erosion that could contribute to higher levels of suspended sediment at water body crossings. A comparison of alternatives showing the number of crossings is provided in **Table 3.5-1**.

Figure 3.5-2 shows the locations of crossings for each alternative. The suspended sediment issue is further discussed below.

TABLE 3.5-1
HYDROLOGY – COMPARISON OF ALTERNATIVES

Alternative	Linear Miles	Mileage Difference Compared to Alternative 2	Stream or River Crossings[a]	Lake Crossings[a]	Total Crossings[a]
1	0	Not Applicable	0	0	0
2	129.9	Not Applicable	10	4	14
3	121.6	8 miles shorter	6	6	12
4	139.6	10 miles longer	17	2	19

Note: [a] A crossing is assumed if a water body is within 250 feet of the reference centerline, the width of the alignment that DEQ would approve. Actual disturbance from construction would typically be less than 100 feet wide as indicated in **Table 2.3-2**.

3.5.3.1 Alternative 1 — No Action

Under the No Action alternative, the existing water use and land use activities near surface water would continue. Activities described under the action alternatives would not take place. There would not be an alteration to area water resources due to transmission line installation and maintenance; therefore, no impacts to water resources would occur.

3.5.3.2 Alternative 2— Proposed Project

Impacts to Surface Water and Floodplains

Despite implementation of a storm water control plan, Alternative 2 would likely result in minor, short-term, adverse impacts to surface water quality by temporarily increasing sources of sediment during the construction phase of the proposed project. Stream crossing construction activities (such as pole placement, road construction, and staging areas for construction) could potentially take place in either a localized area, or parallel and adjacent to a stream. Construction activities in flowing or standing water would result in the greatest impact, and would be avoided. Minor short-term sediment impacts would continue until reclamation was complete and the surface was revegetated. Minor long-term adverse impacts to surface water quality could occur if temporary roads near water crossings were constructed and remained in use after project construction activities were complete.

The Alternative 2 alignment would cross a body of water up to 14 times, including eight perennial streams (Teton River, Pondera Coulee, Spring Coulee, Dry Fork Marias, Schultz Coulee, Bullhead Creek, Marias River, and Red River [three crossings]; and four lakes ranging in size from 7 acres to 121 acres (Black Horse Lake [west finger], an unnamed lake in the Marias River Basin, Hay Lake, and Grassy Lake).

Alternative 2 includes measures to mitigate or prevent adverse impacts to surface water. Pole structures would not be installed below the normal high-water mark. MATL proposes to prepare and implement a Storm Water Erosion Control Plan and comply with all requisite permit conditions. These measures would effectively reduce short-term and long-term risk of sedimentation to surface water to minor adverse impacts.

3.5.3.3 Alternatives 3 and 4

Alternative 3

Adverse, short-term impacts for Alternative 3 are similar to, but slightly less than Alternative 2. Overall, there is less potential to generate suspended sediment for Alternative 3.

The Alternative 3 alignment would cross a body of water only 12 times, including six perennial streams (Teton River, Pondera Coulee, Spring Coulee, Dry Fork Marias, Bullhead Creek, and Marias River) and six lakes ranging in size from 8 acres to 116 acres (Black Horse Lake [west finger], an unnamed lake in the Missouri Sun-Smith Basin, two unnamed lakes in the Marias River basin, and two unnamed lakes in the Upper Milk River Basin).

Alternative 4

Adverse, short-term impacts for Alternative 4 are similar to, but slightly more than Alternative 2 and Alternative 3. Overall, there is more potential to generate suspended sediment for Alternative 4.

The Alternative 4 alignment would cross a body of water up to 19 times, including six perennial streams (Lake Creek, Pondera Coulee, Spring Coulee, Dry Fork Marias, Schultz Coulee [two crossings], Bullhead Creek, the Marias River, and Red River [three crossings]; and two lakes ranging in size from 115 acres to 160 acres (Hay Lake and Grassy Lake).

3.6 Wetlands

3.6.1 Analysis Methods

Wetlands are lands transitional between terrestrial and aquatic systems and are among the most biologically productive ecosystems in the world. Wetlands are defined as areas that are inundated or saturated by surface or groundwater at frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, fens, marshes, bogs, and similar areas (COE 1987).

Wetlands are of critical importance to the protection and maintenance of a large array of plants and animals, including threatened and endangered species, by providing essential seasonal habitats. Wetlands help protect the quality of surface water by impeding the erosive forces of moving water and trapping waterborne sediment and associated pollutants, protecting water supplies by assisting the purification of surface water and groundwater resources, maintaining base flow to surface waters through the gradual release of stored floodwaters and groundwater, and providing a natural means of flood control and storm damage protection through the absorption and storage of water during high-runoff periods.

Activities that involve a disturbance or backfilling of material in a wetland are typically regulated by local, state, and federal government agencies through the authorities granted by Sections 401 and 404 of the U.S. Clean Water Act. Section 401 of the Clean Water Act provides the means for Montana local and state agencies to regulate and control the degree of impact of discharges on state waters, including wetlands. Montana's primary water quality protection is granted through the implementation of the Montana Water Quality Act. Section 404 of the Clean Water Act provides protection for wetlands that (1) meet three criteria (wetland hydrology, hydric soils, and hydrophytic vegetation) as defined in the Wetlands Delineation Manual (COE 1987), and (2) are connected through an inflow or outflow to a defined surface water drainage. Isolated wetlands, such as a prairie pothole or small ponds, are no longer protected by Section 404 of the Clean Water Act (COE 2001). However, any discharge of pollutants to isolated wetlands that contain water is still subject to provisions of the Montana Water Quality Act.

Analysis Area

The analysis area for the wetland resources includes all wetlands (jurisdictional or non-jurisdictional) within the Project study area (**Figure 1.1-1**). Most of the wetlands have been identified, classified, and digitized, and the data are available to download from the FWS website. The analysis addresses the proposed and alternative transmission line alignments in greater detail.

Information Sources

Wetlands within the Project study area are available from a FWS website (FWS 2006) on a format known as National Wetland Inventory (NWI) maps. However, there are no wetland data available for portions in Teton County from approximately the town of Brady south to just north of Benton Lake NWR. Other sources of data, including USGS 7.5-minute topographic maps, FEMA maps, and the 2005 orthophotographs (Montana NRIS 2006a), were used for the Teton County area to determine potential wetlands along the proposed and alternative alignments. In addition, the data provided in the MFSA application (MATL 2006b) were reviewed and field investigations were conducted in July and August 2005 to ground-truth mapped wetlands and identify previously unmapped wetlands.

3.6.2 Affected Environment

The system used to classify the wetland types is based on the classification system developed by Cowardin and others (1979). Three basic types of wetlands, lacustrine (lakes); palustrine (ponds); and riverine (rivers and streams), were identified within the analysis area. Within these three types were 14 individual wetland classes (**Table 3.6-1**). The lacustrine wetlands include intermittent and permanently flooded lakes and reservoirs. The palustrine group includes all wetlands dominated by trees, shrubs, emergents, mosses, or lichens. Two main riverine wetlands (lower perennial and upper perennial) were identified within the analysis area and they typically contain natural or artificial channels that have either periodically or continuously flowing water.

TABLE 3.6-1
WETLAND TYPES MAPPED IN ANALYSIS AREA

No.	Wetland Types	Wetland Class	Wetland Code
1	Lacustrine/Limnetic	Unconsolidated Bottom	L1UB
2	Lacustrine/Littoral	Aquatic Bed	L2AB
3	Lacustrine/Littoral	Unconsolidated Shore	L2US
4	Palustrine	Aquatic Bed	PAB
5	Palustrine	Emergent	PEM
6	Palustrine	Forested	PFO
7	Palustrine	Scrub-Shrub	PSS
8	Palustrine	Unconsolidated Bottom	PUB
9	Palustrine	Unconsolidated Shore	PUS
10	Riverine/Lower Perennial	Unconsolidated Bottom	R2UB
11	Riverine/Lower Perennial	Unconsolidated Shore	R2US
12	Riverine/Upper Perennial	Rock Bottom	R3RB
13	Riverine/Upper Perennial	Unconsolidated Bottom	R3UB
14	Riverine/Upper Perennial	Unconsolidated Shore	R3US

The following factors were considered when evaluating potential impacts to wetland and non-wetland waters of the U.S. resources from the transmission line alternatives:

- Net permanent loss of any wetland areas or functions,
- Net temporary loss of any wetland areas or functions,
- Effects on the condition and functional integrity of other wetlands that may be impacted but do not experience net loss,
- Potential for wetland filling from grading or construction activity or excavation and backfill,
- Potential for wetland flooding from construction activities, incorrect design or placement of culverts, or an increase in impervious areas adjoining wetlands that may raise water levels,
- Potential for wetland draining from grade changes that may divert surface flow that formerly fed wetlands in isolated depressions,
- Potential for wetland sedimentation resulting from surface soil disturbance adjacent to wetlands, and
- Wetland water quality degradation from contaminants in runoff.

Table 3.6-2 provides a percentage and area breakdown for all 14 wetland types that are sited in the analysis area. **Figures 3.6-1, 3.6-2, and 3.6-3** show the location of all mapped wetlands within the study area.

TABLE 3.6-2
PERCENTAGE AND AREA OF WETLAND TYPES IN ANALYSIS AREA

Wetland Type	Percent of Total Wetland Area	Area (acres)
Lacustrine/Limnetic – L1UB	1.2	401
Lacustrine/Littoral – L2AB	4.2	1,429
Lacustrine/Littoral – L2US	11.4	3,909
Palustrine – PAB	4.9	1,694
Palustrine – PEM	69.0	23,635
Palustrine – PFO	0.02	7
Palustrine – PSS	0.4	146
Palustrine – PUB	0.3	106
Palustrine – PUS	3.6	1,240
Riverine/Lower Perennial – R2UB	2.5	865
Riverine/Lower Perennial – R2US	1.1	379
Riverine/Upper Perennial – R3RB	0.02	5
Riverine/Upper Perennial – R3UB	1.0	346
Riverine/Upper Perennial – R3US	0.3	100
Totals	**100.0**	**34,262**

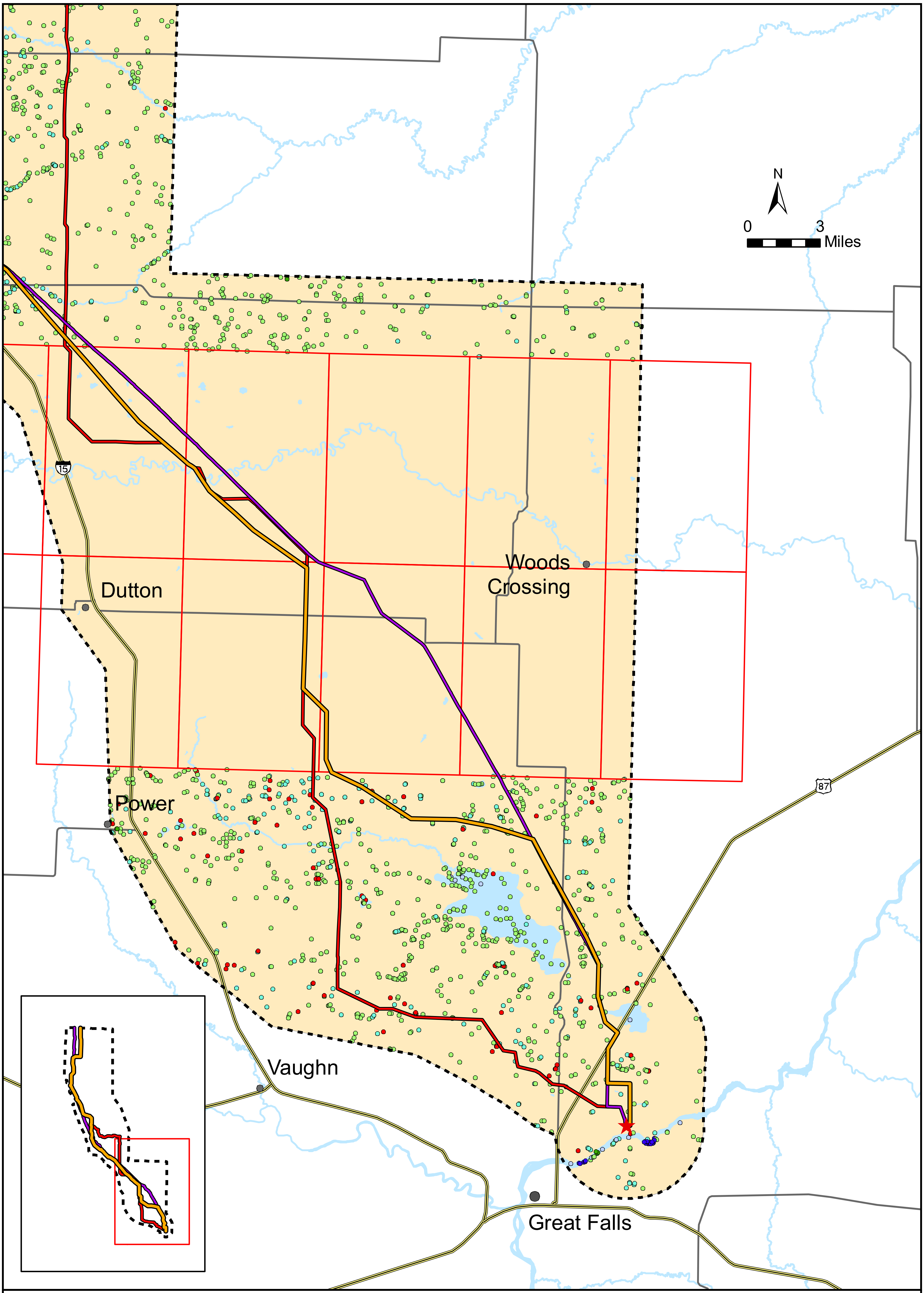

N
0
3
Miles
15
Dutton
Woods
Crossing
Power
87
Vaughn
Great Falls

FIGURE 3.6-1
WETLANDS IN
STUDY AREA
SOUTH

LEGEND

WETLAND TYPE
- 🟩 FRESHWATER EMERGENT WETLAND
- 🟩 FRESHWATER FORESTED - SHRUB WETLAND
- 🟦 FRESHWATER POND
- 🟦 RIVERINE WETLAND
- 🟥 OTHER WETLAND
- 🟦 LAKE
- ☐ 24K TOPO MAPS WITH NO WETLANDS DATA

NOTE: WETLANDS DATA FROM NATIONAL WETLANDS INVENTORY, USFWS.

- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT

- RIVERS AND STREAMS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- ▨ STUDY AREA

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_6-1_MATL_Wetlands_South_012007.mxd

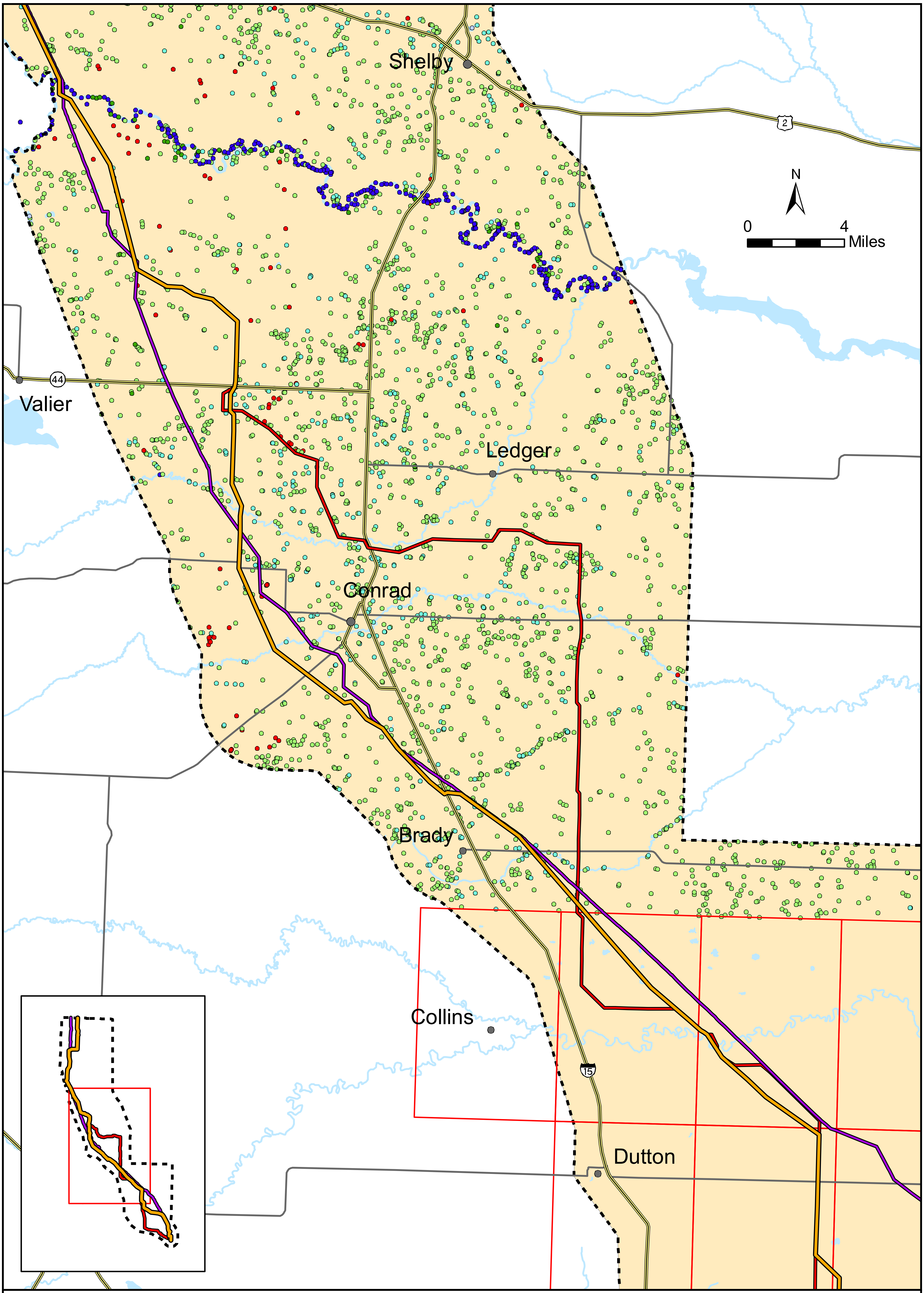

Shelby
2
N
0
4
Miles
44
Valier
Ledger
Conrad
Brady
Collins
15
Dutton
WETLAND TYPE
LEGEND
🟩 FRESHWATER EMERGENT WETLAND
🟩 FRESHWATER FORESTED - SHRUB WETLAND
🟦 FRESHWATER POND
🟦 RIVERINE WETLAND
🟥 OTHER WETLAND
🟦 LAKE
☐ 24K TOPO MAPS WITH NO WETLANDS DATA
NOTE: WETLANDS DATA FROM NATIONAL WETLANDS INVENTORY, USFWS.
ALT2 - ALIGNMENT
ALT3 - ALIGNMENT
ALT4 - ALIGNMENT
RIVERS AND STREAMS
● CITIES AND TOWNS
★ ALIGNMENT END AND EXIT POINTS
STUDY AREA
NOTE:
ALT = ALTERNATIVE

FIGURE 3.6-2
WETLANDS IN STUDY AREA MIDDLE

GIS map by Ed Madej -TTEMI-HE Fig3_6-2_MATL_Wetlands_middle_012007.mxd

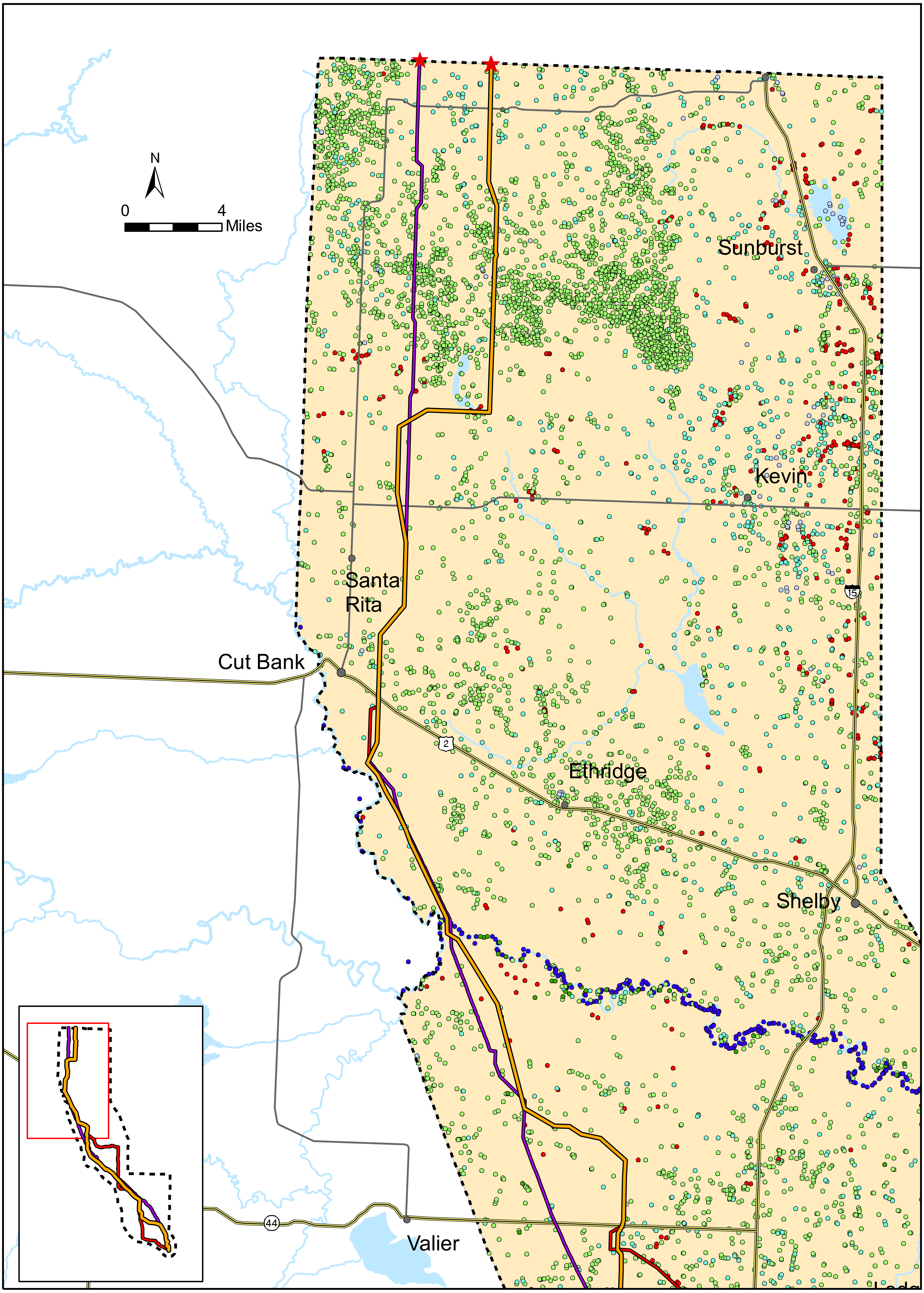

N
0
4
Miles
Sunburst
Kevin
Santa Rita
Cut Bank
Ethridge
Shelby
Valier
2
15
44

FIGURE 3.6-3 WETLANDS IN STUDY AREA NORTH

LEGEND

WETLAND TYPE

- 🟩 FRESHWATER EMERGENT WETLAND
- 🟩 FRESHWATER FORESTED - SHRUB WETLAND
- 🟦 FRESHWATER POND
- 🟦 RIVERINE WETLAND
- 🟥 OTHER WETLAND
- 🟦 LAKE
- ☐ 24K TOPO MAPS WITH NO WETLANDS DATA

NOTE: WETLANDS DATA FROM NATIONAL WETLANDS INVENTORY, USFWS.

- ━ ALT2 - ALIGNMENT
- ━ ALT3 - ALIGNMENT
- ━ ALT4 - ALIGNMENT

- ━ RIVERS AND STREAMS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- ▨ STUDY AREA

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_6-3_MATL_Wetlands_North_012007.mxd

Palustrine wetlands are the most common wetland type in the analysis area and are primarily found along creek channels, coulees, and in association with prairie potholes formed by depressions left by glaciation. Coulees often have a flat-bottomed valley enclosed by somewhat steep hillsides with the wetland areas generally restricted to the narrow incised stream channel (MATL 2006b). Many of the prairie potholes are less than 1 acre in size and may have permanent, semipermanent, or seasonal to temporary inundation (Montana Partners in Flight 2000). Prairie potholes can either be landlocked, or have a drainage outlet to an adjacent stream or other potholes.

The palustrine emergent wetlands account for approximately 69 percent of the total wetlands (**Table 3.6-1**). Palustrine emergent wetlands are characterized by erect, rooted, herbaceous hydrophytic vegetation and are often dominated by perennial plants (Cowardin and others 1979). Drainages in the MATL analysis area contain overstory vegetative communities comprised of trees and shrubs, such as boxelder (*Acer negundo*), silver sagebrush, chokecherry, Woods’ rose, willow, silver buffaloberry, and western snowberry (MATL 2006b). The palustrine emergent wetland areas are found primarily along the current channels and in older meander lobes within the drainage valley. Palustrine emergent vegetation may occur as an understory component in areas mapped as riparian or forested sections of the drainage. Where not previously cultivated, the vegetation types in the prairie pothole wetlands within the analysis area are dominated by herbaceous communities, including water sedge (*Carex aquatilis*), clustered field sedge (*Carex praegracilis*), narrow spike reedgrass (*Calamagrostis stricta*), Baltic rush (*Juncus balticus*) and tufted hairgrass (*Deschampsia caespitosa*), as well as shrubby cinquefoil (*Dasiphora floribunda*) (MATL 2006b).

Most of the prairie potholes in the analysis area have standing water for much of the growing season in years of normal or above normal precipitation. These depressional geomorphic features capture water from precipitation, snowmelt, and from groundwater (Hansen and others 1995). Typically the water is retained in the potholes due to a bottom soil layer with reduced permeability. Evaporation and transpiration are the major causes of water loss, although seepage and surface outflow can also be sizable for some potholes (Hanson and others 1995). However, during dryer periods, some portions of potholes often become incorporated into farming plans and are either planted to row crops (for example wheat) or are mowed as part of a haying operation. Prairie pothole wetland losses are estimated to be from 30 to 50 percent in Montana (Montana Partners in Flight 2000). Prairie pothole wetlands are often difficult to delineate and characterize because the wetland indicators and other parameters may be periodically lacking due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events (COE 1987). Prairie potholes occur throughout the analysis area; however, the potential to encounter prairie potholes declines in the southern portion of the analysis area due to changes in geomorphology and to agricultural practices that may have impacted or eliminated the smaller wetlands.

The most notable lacustrine wetland area in the analysis area is found in the southern portion. Benton Lake NWR is located 12 miles north of Great Falls. It is at the western edge of the farmed Prairie Pothole region, a region characterized by millions of wetlands or potholes, which serve as the breeding ground for most of the Nation's waterfowl (MATL 2006b). The 19-square-mile Benton Lake NWR was established in 1929 as a refuge and breeding ground for birds. Despite its name, Benton Lake is actually a 5,000-acre shallow wetland created by the last continental glacier thousands of years ago. During the late 1950s and early 1960s, a pump house and pipeline were built to bring water to the refuge from Muddy Creek. Dikes were built to divide the wetland into manageable units, and refuge roads and facilities were constructed. Water still flows from the original pump station on Muddy Creek, but the refuge wetlands have been further divided for more efficient water management.

The wetland areas provide valuable tree and understory plant diversity, stable coulee bottoms that can attenuate and alter flood flows, and valuable breeding areas for duck species, eared, horned, and red-necked grebes, Franklin's gull, Forster's terns, black terns, yellow-headed blackbirds, and Wilson's phalaropes. MATL project wetlands also provide important habitat for nesting and foraging for many birds and other wildlife species. In particular, the 5,000 acres of shallow wetlands associated with the Benton Lake NWR area are managed primarily to provide refuge and breeding ground for birds.

The riverine wetland types mapped within the analysis area are the seasonally and permanently flowing river channel bottoms associated with the Teton River, Pondera Coulee, Spring Coulee, Dry Fork Marias, Schultz Coulee, Bullhead Creek, Marias River, and Red River. The Marias, Dry Fork Marias, and Teton rivers support the most important forested riparian habitats in the analysis area (MATL 2006b). The riverine habitats typically have an understory of grasses and shrubs with an overstory of cottonwood trees (plains cottonwood and narrowleaf cottonwood) and other larger deciduous shrubs and trees (chokecherry, wild currant, Woods' rose, and willows) that intermittently line the rivers.

3.6.3 Environmental Impacts

This section describes the types of impacts that could occur and effects of these impacts on wetland resources specifically. **Table 2.3-4** addresses mitigation measures and best management practices that can be implemented to reduce potential impacts to wetlands and surface water resources.

Potential impacts to wetlands associated with the construction and operation of the MATL 230-kV transmission line project include:

1. alterations to the wetland hydrology,
2. alterations to the wetland plant communities, and
3. loss of wetlands due to filling or sedimentation.

Alterations to the wetland hydrology would most likely occur during the construction phase when working in adjacent areas causes surface water flows to be changed or modified. Many of the wetlands in the analysis area are palustrine emergent wetlands. These wetlands are situated just below the high water line; thus any small modification to the existing drainage pattern could potentially re-direct surface water flows away from these areas that depend on temporary flood waters to saturate the soils and create wetland conditions.

Alterations to the wetland plant community are also most likely to occur during the transmission line construction phase. A change in the composition of the wetland plant community may be associated with and result from an alteration to the wetland hydrology, or this impact may be unrelated. A wetland plant community may be physically altered by mechanical disturbance during the construction activities, or the vegetation could be only temporarily trampled from parking or driving across these areas.

No direct filling or covering of wetland areas is intended as a result of implementing any of the action alternatives. However, construction activities adjacent to wetlands may inadvertently result in erosion sediment transport and deposition into wetlands as the result of exposed soils and concentrated runoff down vehicle tracks and roads. MATL would implement erosion and sediment control practices as required by the State of Montana (**Appendix F**). MATL would also reduce or avoid impacts to wetlands by implementing mitigation, avoidance, or other environmental protection measures (MATL 2006b).

The areas of individual wetlands were determined based on the shape and size of the polygons in the existing NWI maps. MATL would avoid individual wetlands by working with the engineering designs to span or align around all wetlands within the 500-foot-wide alignment (MATL 2006b). In addition, the Benton Lake NWR wetlands would not be directly affected by the action alternatives. Potential indirect impacts to the Benton Lake NWR wetlands would be associated with a potential reduction of habitat (Section 3.8 Wildlife).

In order to assess potential impacts of the MATL transmission line project to wetlands, typical construction and operational practices used in the utility industry were reviewed. Potential impacts to wetlands were evaluated in association with the need to construct access roads and in relationship with the methods used and engineering constraints involved with spanning over and constructing around wetlands and drainage crossings. MATL may not require any Section 404 and 401 permits if it avoids discharging sediment or fill materials into wetlands or Waters of the U.S. The wetland impact assessment assumes MATL would comply with all requisite permitting requirements. Each alternative was evaluated to determine the potential number of wetlands, size of wetlands, and the general location of wetlands and ephemeral drainage crossings.

3.6.3.1 Alternative 1 – No Action

The No Action alternative would produce no adverse impacts to wetland resources. However, negligible to minor, long-term adverse impacts would continue from existing land uses. Runoff and erosion, primarily from agricultural lands, would continue to carry sediments and possibly nutrients and other pollutants to wetlands and surface water resources causing potential impacts. Sedimentation is a major contributor to the impairment of streams and rivers and reduction of functions for wetlands in Montana and the U.S.

3.6.3.2 Alternative 2 – Proposed Project

Wetland types and amounts potentially impacted by Alternative 2 are provided in **Table 3.6-3**.

TABLE 3.6-3
WETLANDS POTENTIALLY AFFECTED BY ALTERNATIVE 2

NWI Wetland Class	Acres within 500-foot alignment
Palustrine Emergent (PEM)	59.1
Palustrine Unconsolidated Shore/Bottom/Aquatic Bed (PUS, PUB, & PAB)	5.3
Lacustrine (L2)	0.8
Riverine (R3)	2.4
Total	67.6

In total, about 67.6 acres of wetlands have been mapped within the 500-foot Alternative 2 alignment. The largest wetland crossing within the Alternative 2 500-foot alignment would be approximately 510 feet. This wetland could be spanned assuming a typical span length of 500 to 800 feet. The wetland total acreage does not include any wetlands that were visually identified by MATL (MATL 2006b) in the approximately 22 miles of the Alternative 2 alignment through Teton County where no official NWI data currently exist. Recent aerial photographs from 2005 of the Alternative 2 alignment through Teton County were reviewed. In concurrence with MATL, several small wetland areas were observed on the photographs, but acreage quantification was not possible. No single large wetland or concentration of wetlands covering more than approximately 500 feet was noted.

Most of the potentially impacted wetlands (approximately 87 percent) were palustrine emergent wetlands with only about 2.41 acres of riverine wetlands impacted at the Teton River, Dry Fork Marias River, and Marias River crossings. Approximately 75 percent of the potentially impacted wetlands are located in the area north of Cut Bank (Milk River Pothole area) and an area east and south of Conrad (Teton River area). The potential impacts to these wetlands are alterations to the hydrology, alterations to the plant communities, and some minor filling from local sediment. The greatest potential impact to wetlands would be during construction.

The Alternative 2 alignment does cross approximately 0.8 acres of a delineated seasonally flooded lacustrine area near milepost 5 by Black Horse Lake. MATL has stated that it would conduct a soil investigation of this area and use either self-supporting steel poles with concrete caisson foundations or 3-pole wood structures with poles installed inside pipe piles. Guy wire screw anchors would be installed to an adequate holding capacity depth for this specific location (Williams 2007). The remaining wetlands are scattered along the alignment, including near the Benton Lake NWR area. Overall with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to wetlands under Alternative 2 would be minor and primarily of short duration.

3.6.3.3 Alternative 3 – MATL B

Alternative 3 is 8.3 miles shorter than Alternative 2 (121.6 miles vs. 129.9 miles) due to more diagonal segments along the entire alignment. The wetland types impacted by this alternative are of a similar class as those under Alternative 2, but the area of potentially impacted wetlands is less under Alternative 3 **(Table 3.6-4)**.

TABLE 3.6-4
WETLANDS POTENTIALLY AFFECTED BY ALTERNATIVE 3

NWI Wetland Class	Acres within 500-foot alignment
Palustrine Emergent (PEM)	49.7
Palustrine Unconsolidated Shore/Bottom/Aquatic Bed (PUS, PUB, & PAB)	8.3
Lacustrine (L2)	0.8
Riverine (R3)	3.5
Total	62.3

A total of about 62.3 acres of wetlands within the 500-foot alignment have been mapped along the Alternative 3 alignment, compared to 67.6 acres along the Alternative 2 alignment. The total wetland area does not include any wetlands visually identified by MATL (MATL 2006b) during the baseline field work in the 25 miles of this alternative alignment where no official NWI data currently exist. Aerial photographs from 2005 of the 25-mile section where no wetland data exist were reviewed. In concurrence with MATL, several small wetland areas were observed on the photographs, but exact acreage quantification was not possible. No single large wetland or a concentration of wetlands that could not be spanned by 500- to 800-foot span lengths was noted.

Most of the impacted wetland acres (58 acres or 93 percent) are palustrine emergent or palustrine unconsolidated wetlands with about 3.5 acres of riverine wetlands impacted at the Teton, Dry Fork of the Marias, and the Marias River crossings. This Alternative 3 alignment is similar to Alternative 2 with approximately 75 percent of the potentially impacted wetlands located north of Cut Bank (Milk River Pothole area) and east and south of Conrad (Teton River area). The Alternative 3 alignment would also cross approximately 0.8 acre of the seasonally flooded lacustrine area near milepost 5 by Black Horse Lake. MATL would enact the same procedures for any structures placed in this area, as described for Alternative 2 above. The remaining wetlands are scattered along the alignment, including near the Benton Lake NWR area. Overall with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to wetlands under Alternative 3 would be minor and primarily of short duration.

3.6.3.4 Alternative 4 – Agency Alternative

Alternative 4 is 139.6 miles in length, which is about 9.7 miles longer than the proposed Project (139.6 miles compared to 129.9 miles). This alternative is composed of 60.9 miles of the Alternative 2 alignment and 78.7 miles of agency-developed alignments that branch off the Alternative 2 alignment. The 78.7 miles of agency alignments were developed to address identified local scoping issues and concerns, but were not specifically developed to mitigate any potential impacts to wetland resources. The wetland types impacted by this alternative are similar to those under the Alternative 2 and Alternative 3. However, the area of potentially impacted wetlands is greater for Alternative 4, primarily due to its greater length. The wetland types impacted under this alternative are shown in **Table 3.6-5**.

In total approximately 76.4 acres of wetlands have been mapped within the 500-foot Alternative 4 alignment, compared to 67.7 acres along the Alternative 2 alignment. The total wetland area does not include any wetlands visually identified by MATL (MATL 2006b) during the baseline field work in the approximately 25 miles of this alternative alignment where no official NWI data currently exist. Aerial photographs from 2005 of the 25-mile section where no wetland data exist were reviewed. In concurrence with

MATL, several small wetland areas were observed on the photographs, but exact acreage quantification was not possible. No single large wetland or a concentration of wetlands that could not be spanned by 500- to 800-foot span lengths was noted.

TABLE 3.6-5
WETLANDS POTENTIALLY AFFECTED BY ALTERNATIVE 4

NWI Wetland Class	Acres within 500-foot alignment
Palustrine Emergent (PEM)	69.8
Palustrine Unconsolidated Shore/Bottom/Aquatic Bed (PUS, PUB, & PAB)	4.2
Lacustrine (L2)	0.0
Riverine (R3)	2.4
Total	76.4

Alternative 4 traverses around the southern and western sides of Benton Lake NWR area and would potentially impact fewer acres of wetlands from Great Falls to milepost 27.3, compared to Alternative 2, for this area. Several smaller palustrine and lacustrine wetlands, directly north of Great Falls (Black Horse Lake area) and along the western side of Benton Lake NWR, would be avoided by the Alternative 4 alignment.

The Alternative 4 alignment would cross Lake Creek, Teton River, Dry Fork Marias River, Marias River, and several major coulees (South Pondera, Pondera, Favot, and Big Flat. The higher proportion of coulees and unfarmed drainages that were used by Alternative 4 in order to avoid farmed land is a primary reason for the increased number of wetlands crossed by the Alternative 4 alignment compared to alternatives 2 and 3. The Alternative 4 alignment east of Conrad crosses slightly larger and more defined drainages due to its more eastern location. Drainages generally flow west to east in this area and tend to have more defined channels as they flow toward the Missouri River.

Most of the potentially impacted wetland acres (74 acres or 97 percent) are palustrine emergent or palustrine unconsolidated wetlands with only about 2.4 acres of riverine wetlands impacted at the Teton, Dry Fork of the Marias, and Marias River crossings. Alternative 4 would avoid the small seasonally flooded lacustrine area at Black Horse Lake. Overall, with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to wetlands under Alternative 4 would be minor and primarily of short duration.

Potential Mitigation and Best Management Practices

Mitigation measures have been developed by MATL to help avoid and minimize impacts to wetlands from the proposed Project and alternatives. MATL's mitigation measures are not necessarily exclusive for wetland and stream crossings and may provide concurrent benefits for impacts to soils and other biological resources. MATL's stated measures to mitigate potential impacts to wetlands include:

1) Avoiding existing wetlands and drainage channels to the maximum extent possible by completely spanning all wetlands, prairie pothole wetlands, riparian vegetation, coulees, Marias River, and Teton River.
2) Avoiding placement of transmission line structures (poles) in riparian vegetation areas.
3) Implementing erosion and sediment control best management practices during construction, as required by the State of Montana.
4) Completing timely seeding of all areas affected by project activities with native and/or non-invasive seed mixes to prevent soil erosion.

Agency-developed mitigation measures, applicable to wetlands, would be attached to DEQ's Environmental Specifications (**Appendix F**). One agency mitigation measure for wetlands would be for MATL to delineate all wetlands and waters of the U.S. along any selected alignment that traverses Teton County where no official NWI data currently exist. Delineating the wetlands would assist in minimizing potential alterations to the hydrology and plant communities during construction and allow placement of mitigation measures at the appropriate locations. Additional mitigation measures specific to wetlands may be required by the U.S. Army Corps of Engineers under their Nationwide # 12 Permit (Utilities Line Activities) which would apply to any construction, maintenance, and repair of utility lines and associated facilities in wetlands and waters of the U.S. The additional wetland mitigation measures would help ensure no net loss of wetland acreage and a consistent approach for mitigating potential impacts to wetlands associated with the MATL transmission line project.

3.6.4 Floodplain or Wetland Assessment

This assessment of potential floodplain or wetland impacts of the proposed Project is included pursuant to DOE requirements in 10 CFR 1022.

3.6.4.1 Project Description

The proposed Project is described in Section 2.3. Some transmission line support structures would be located in floodplains. The "high hazard area" of a floodplain is defined in 10 CFR 1022.4 as "those portions of riverine and coastal floodplains nearest the source of flooding that are frequently flooded and where the likelihood of flood losses and adverse impacts on the natural and beneficial values served by floodplains is greatest." Structures would not be constructed below the normal high-water mark of surface water bodies, and high hazard areas of floodplains would be avoided.

3.6.4.2 Floodplain or Wetland Impacts

Surface water and wetlands resources are described in Section 3.5.2 and 3.6.2, respectively. Construction of structures would affect floodplains. Construction could result in erosion and sedimentation in surface water, especially if flooding occurs during construction. Construction would not occur in flowing or standing water. Structures and access roads would not be constructed in obvious flood channels. Floodplain storage volumes would not be affected, and flood stages would not increase measurably, due to the presence of structures. Little or no riparian vegetation would be disturbed during construction or operation of the transmission line. All wetlands would be spanned.

3.6.4.3 Alternatives

All of the alternatives considered would cross floodplains. Few structures would be placed directly in floodplains, so none of the alternatives is expected to have significant adverse impacts on floodplain function. No adverse impacts from flooding are expected to adjacent or downstream property owners in these sparsely populated areas.

3.7 Vegetation

3.7.1 Analysis Methods

Analysis Area

Quantitative analysis of acres for various vegetation communities in each alignment was derived from orthophotograph interpretation of cover types along the proposed alternatives. Assumptions associated with GIS derived acreages of vegetation resources include:

- GIS data are based on 2005 orthophotographs (Montana NRIS 2006a) that were hand digitized in 2006. Some misidentification may have occurred due to orthophotograph resolution, and changes in vegetation type and condition since the photographs were taken.
- The analysis area consists of 250 feet on either side of each alignment centerline.
- Except as noted, all newly constructed access roads would be located within the 500-foot alignments.

All common and scientific plant names are based on the USDA PLANTS Database (NRCS 2006b).

Information Sources

Resources addressed in this section include the various vegetation community types, special status plant species, and noxious weeds. Community type and distribution data are based on field evaluations conducted in 2005 by MATL. Additional data sources include the NHP (2006b) and the Montana NRIS. Montana Gap Analysis Program (GAP) (Redmond and others 1998) data were reviewed and determined to be inappropriate for vegetation classification at this scale and inaccurate due to land cover changes since publication of the data set.

3.7.2 Affected Environment

This section addresses the environmental baseline conditions for vegetation resources in the Project area. The large spatial extent of the Project area encompasses many different vegetation types and communities. Vegetation communities in Montana are generally determined by topography, soil type, and climate (NHP 2002). In general, dominant vegetative communities include irrigated and non-irrigated farmland, fallow crops, CRP areas, native shrub and grassland communities, and riparian and wetland communities.

Three dominant Level IV ecoregions, described by Woods and others (2002), are found within the Northwestern Glaciated Plains Ecoregion. The Northwest Glaciated Plains Ecoregion includes the North Central Brown Glaciated Plains, Foothill Grasslands, and Milk River Pothole Uplands Level IV regions. The Northwestern Glaciated Plains are characterized as the transition zone between the more level, moister Northern Glaciated Plains to the east and the dryer, irregular Northwestern Great Plains to the west and southwest. The Northwestern Glaciated Plains are well suited for agriculture with much of the area having been converted to farmland. **Table 3.7-1** presents the environmental attributes of the three Level IV Ecoregions found in the Project area.

TABLE 3.7-1
PROJECT AREA LEVEL IV ECOREGIONS

Level IV Ecoregion	Elevation (feet)	Precipitation Mean Annual (inches)	Potential Natural Vegetation
North Central Brown Glaciated Plains	2,500 to 4,200	11 to 15	Grama- needlegrass-wheatgrass
Foothill Grasslands	3,500 to 5,500	11 to 22	Wheatgrass-fescue
Milk River Pothole Uplands	3,700 to 4,350	11 to 14	Grama- needlegrass-wheatgrass

Notes:
Sources: Woods and others (2002) and Kuchler (1964).

Potential natural vegetation for the Project area is dominated by the grama-needlegrass-wheatgrass and wheatgrass-fescue community types (Woods and others 2002). Mixed grass prairie in these areas is typified by open (40 to 60 percent canopy cover) graminoid dominated vegetation. Dominant native graminoids throughout the Project area include bluebunch wheatgrass (*Pseudoroegneria spicata*) and blue grama (*Bouteloua gracilis*) (**Table 3.7-2**). Bluebunch wheatgrass often shares dominance with needle-and-thread (*Hesperostipa comata*); blue grama is usually present in differing amounts depending on past grazing history. Western wheatgrass (*Pascopyrum smithii*) is also important in localized areas. Shrub cover is typically less than 10 percent in these communities with dominant species including broom snakeweed (*Gutierrezia sarothrae*), plains pricklypear (*Opuntia polyacantha*), and occasionally rubber rabbitbrush (*Ericameria nauseosa*)(NHP 2006a). Saline areas support alkali grass (*Puccinellia* spp.), wild barley (*Hordeum* spp.), greasewood (*Sarcobatus vermiculatus*), saltwort (*Salicornia rubra*), and Pursh seepweed (*Suaeda calceoliformis*)(MATL 2006b).

TABLE 3.7-2
DOMINANT PLANT SPECIES COMBINATIONS IN THE PROJECT AREA

Common Name	Scientific Name	Location
Short- and Mid-grass Prairie		
Blue Grama	*Bouteloua gracilis*	Breaks above Marias and Teton rivers
Thickspike Wheatgrass	*Elymus lanceolatus*	North of Cut Bank, some CRP
Needle-and-thread	*Hesperostipa comata*	Breaks above Marias and Teton rivers, coulees
Northern Porcupine Grass	*Hesperostipa curtiseta*	Breaks above Marias and Teton rivers
Green Needlegrass	*Nassella viridula*	Southern, below 230-kV switch yard
Western Wheatgrass	*Pascopyrum smithii*	Breaks above Marias and Teton rivers, coulees
Foxtail Barley	*Hordeum jubatum*	Saline soil patches
Badlands		
Silver Sagebrush	*Artemisia cana*	Kevin Rim, Dry Fork Marias River
Thickspike Wheatgrass	*Elymus lanceolatus*	North of Cut Bank
Creeping Juniper	*Juniperus horizontalis*	Trunk Butte, Kevin Rim
Shrublands		
Silver Sagebrush	*Artemisia cana*	Marias and Teton rivers; Kevin Rim
Blue Grama	*Bouteloua gracilis*	Missouri Plateau breaks/Rim north of Great Falls; Marias and Teton rivers
Needle-and-thread	*Hesperostipa comata*	Missouri Plateau breaks/Rim north of Great Falls; Marias and Teton rivers
Western Wheatgrass	*Pascopyrum smithii*	Breaks above Marias and Teton rivers, coulees
Silver Buffaloberry	*Sheperdia argentea*	Red River; coulees north of Cut Bank and central area
Riparian		
Boxelder	*Acer negundo*	Kevin Rim; coulees
Silver Sagebrush	*Artemisia cana*	Marias, Teton, Dry Fork Marias rivers
Sedge	*Carex spp.*	Marias and Teton rivers, coulees
Spikerush	*Eleocharis spp.*	Teton River, coulees
Western Wheatgrass	*Pascopyrum smithii*	Marias and Teton rivers, coulees
Plains Cottonwood	*Populus deltoides*	Marias and Teton rivers
Narrowleaf Cottonwood	*Populus angustifolia*	Marias and Teton rivers
Chokecherry	*Prunus virginiana*	Marias and Teton rivers, coulees
Wild Currant	*Ribes spp.*	Marias and Teton rivers, coulees
Woods' Rose	*Rosa woodsii*	Marias and Teton rivers, coulees
Peachleaf Willow	*Salix amygdaloides*	Dry Fork Marias River, coulees
Willow	*Salix spp.*	Rivers, coulees
Silver Buffaloberry	*Sheperdia argentea*	coulees
Western Snowberry	*Symphoricarpos occidentalis*	Rivers, draws, coulees

Notes:
Table is not intended to be a comprehensive list, rather a characterization of dominant species in the Project Area.
Source: MATL 2006b.

Shrublands are comparatively rare and occupy a very small portion of the Project area. These communities tend to be small and isolated, and are generally located in badlands, upland draws, and terraces along riparian zones. The primary upland shrub community throughout the northern portion of the Project area is silver buffaloberry, which occurs as small, isolated patches in protected draws, drainage heads, and swale bottoms. Silver sagebrush occurs in relatively mesic sites, and is generally found as stringers on the upper floodplain terraces of the larger creeks and rivers in the area, particularly the Dry Fork Marias River (MATL 2006b) (**Table 3.7-2**).

Historically drought, fire, and periodic grazing were the dominant disturbance factors in this area (USDA Forest Service 1994). Conversion of native grasslands to agricultural uses has yielded highly fragmented native communities and altered historic disturbances. Other disturbances such as livestock grazing and rangeland managed under the CRP have produced native communities in a variety of ecological and successional conditions, in turn providing opportunity for the introduction of noxious weed species. CRP rangelands are dominated by wheatgrass (*Agropyron* spp.), alfalfa (*Medicago* spp.), clover (*Trifolium pratense*), and annual weeds for example, yellow salsify (*Tragopogon dubius*)(MATL 2006b).

3.7.2.1 Riparian Vegetation

Riparian vegetation plays an important role in many physical processes within riparian areas. Riparian vegetation dissipates energy and filters and retains sediment during peak flow periods. The vegetation also immobilizes, stores and transforms chemical inputs such as nitrogen. Riparian communities also stabilize streambanks and moderate instream conditions such as temperature, to provide valuable fish and wildlife habitat (Schultz and others 1994). Data characterizing riparian vegetation in the Project area rely predominately on MATL field investigations and were taken from the MATL MFSA application (MATL 2006b) unless otherwise noted.

Riparian communities within the Project area are generally restricted to the Marias River, Teton River, coulees, and along small ephemeral tributaries of the Marias and Teton rivers. The character of these riparian zones is directly related to soil moisture as determined by drainage basin size and dimensions, the annual flooding regime, and the proximity to the head of the drainage. These drainages experience large seasonal and annual hydrologic variability, resulting in relatively undeveloped floodplains in most of the Project area. Riparian habitats are better developed and more complex along the Marias River and Teton River. The coulees and smaller streams are relatively xeric and do not support substantial riparian vegetation. Generally, riparian zones within the Project area consist of herbaceous (*Carex* spp.) and willow communities in the wettest zones, which transition to western snowberry, Woods' rose, and silver sagebrush-western wheatgrass communities on the upper floodplain terraces. The Marias River and Teton River support narrow, discontinuous patches of cottonwood stands interspersed by broader terraces supporting silver sagebrush-western wheatgrass. On shaded slopes of valleys and river terraces, aspen, willow, cottonwood, and box-elder occur (**Table 3.7-2**).

The Marias and Teton rivers support the most important forested riparian habitats in the Project area. Riparian habitats along the Marias and Teton rivers include oxbow marshes and shrub-dominated terraces. The defining feature, however, is the cottonwood stands that line the rivers in places. Despite the fact that these riparian forests have been reduced and fragmented by conversion of the floodplain to irrigated agriculture and pasture (Jones 2003), they remain the only important native forested habitat within the Project area. The width of the cottonwood stands varies between 0 and 500 feet.

In places, mature cottonwood trees dominate the Marias River and Teton River riparian communities. Mesic floodplains support a diverse understory that may include box elder, peachleaf willow, yellow willow, and chokecherry. Xeric floodplain terraces support a less diverse shrub layer dominated by western snowberry and Woods' rose, or lack a shrub component altogether. The native grasses that once characterized these stands have been largely replaced by exotic species (for example, *Poa pratensis*). Grazing has greatly altered the shrub composition in these communities (Jones 2003). River terraces that are no longer subjected to seasonal flooding or are not farmed often support a silver sagebrush-western wheatgrass community. Lack of flood disturbance has changed the ecological dynamics by suppressing cottonwood regeneration and facilitating the colonization of invasive species such as Russian olive (*Elaeagnus angustifolia*).

Noxious Weeds

Invasive plants are often early successional, pioneer species that colonize quickly following disturbance. They typically produce large quantities of seed that germinate quickly and are highly competitive. Both native and nonnative invasive plants are found throughout Montana. Noxious weeds are defined as "any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities" (7-22-2101, MCA). Furthermore, noxious weeds are highly aggressive and lack native insects and diseases that aid in limiting the spread and distribution of the species. Some species can establish without soil disturbance and displace healthy native communities, resulting in noxious weed monocultures. Localized areas of spotted knapweed were found in the floodplain of the Marias River near Sullivan Bridge (Glacier County) and in the floodplain of the Teton River near Kerr Bridge (Teton County). Leafy spurge is also broadly distributed along the Marias River. Two additional noxious weeds, Canada thistle and field bindweed are located in the Project area. Canada thistle was found in the terraces above the Dry Fork Marias River

(MATL 2006b). Montana Noxious Weed Survey and Mapping project data, hosted on NRIS, indicate populations of Dalmation toadflax near Conrad, Russian knapweed along the Marias and Teton river corridors, and leafy spurge scattered throughout the Project area (Montana Noxious Weed Survey and Mapping 1998). **Table 3.7-3** lists several other noxious weed species located within counties in the Project area.

TABLE 3.7-3
CATEGORY ONE AND TWO NOXIOUS WEEDS FOUND IN COUNTIES WITHIN THE PROJECT AREA

Common Name	Scientific Name	Habitat
Category 1- Widespread Noxious Weeds		
Canada thistle	*Cirsium arvense*	Reported in all project area counties.
Common tansy	*Tanacetum vulgare*	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Toole and Pondera Counties.
Dalmatian toadflax	*Linaria dalmatica*	Reported in all project area counties.
Diffuse Knapweed	*Centaurea diffusa*	Reported in all project area counties.
Field bindweed	*Convolvulus arvensis*	Reported in all project area counties.
Houndstongue	*Cynoglossum officinale*	Reported in all project area counties.
Leafy spurge	*Euphorbia esula*	Reported in all project area counties.
Ox-eye daisy	*Chrysanthemum leucanthemum*	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Pondera and Teton Counties.
Russian knapweed	*Acroptilon repens*	Reported in all project area counties.
Spotted knapweed	*Centaurea stoebe*	Reported in all project area counties.
St. Johnswort	*Hypericum perforatum*	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Teton County.
Sulfur cinquefoil	*Potentilla recta*	Reported in Glacier, Pondera, Cascade and Chouteau Counties. Historically present in Toole County.
Whitetop or hoary cress	*Cardaria draba*	Reported in all project area counties except Glacier County (historically present).
Yellow toadflax	*Linaria vulgaris*	Reported in all project area counties.
Category 2- Established New Invaders		
Dyers woad	*Isatis tinctoria*	Historically present in Pondera and Chouteau Counties, but not currently reported.
Meadow hawkweed complex	*Hieracium pratense, H. floribundum, H. piloselloides*	Historically present in Pondera and Chouteau Counties.
Perennial pepperweed	*Lepidium latifolium*	Reported in Toole, Pondera, Teton, Cascade and Chouteau Counties.
Purple loosestrife or Lythrum	*Lythrum salicaria, L. virgatum*	Reported in Pondera and Cascade Counties. Historically present in Toole County.
Tall buttercup	*Ranunculus acris*	Reported in Glacier County. Historically present in Teton County.
Tamarisk	*Tamarix* spp.	Reported in Cascade and Chouteau Counties. Historically present in Teton County.

Source: MATL 2006b

3.7.3 Environmental Impacts

3.7.3.1 Alternative 1 - No Action

Alternative 1 would not have any effects on vegetation resources (riparian vegetation, species of concern, or weed control) in the analysis area.

3.7.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Rangeland vegetation, such as grassland, improved pasture, seeded grasslands, shrubland, badland, and riparian and wetland areas, would be removed by the construction of access roads and structures and at construction staging areas. Impacts to riparian and wetland areas would be minimal as these areas would only be disturbed when absolutely necessary. Maintenance activities would not likely result in additional ground disturbance. Alternative 4 impacts the greatest amount of rangeland cover types (50.8 miles) and is 9.7 miles longer than Alternative 2. The increased crossing in rangeland cover types would result in more tower structures and access roads, thus increasing rangeland impacts. Disturbance due to maintenance activities would also increase over the life of the Project due to increased structure and road placement in rangeland and vegetation. Linear miles of rangeland cover types affected by alternative are presented in **Table 3.7-4**. Disturbance resulting from staging areas would be similar for all alternatives.

TABLE 3.7-4
NATIVE VEGETATION COVER TYPES
CROSSED BY ALTERNATIVES 2, 3, AND 4

Rangeland Cover Types	**Alternative 2**		**Alternative 3**		**Alternative 4**	
	Miles	Cover Types (percent)	Miles	Cover Types (percent)	Miles	Cover Types (percent)
Grassland/ Shrubland	33.6	25.9	21.6	17.8	49.3	35.2
Riparian	1.9	1.5	1.3	1.1	1.5	1.1
Forest (Cottonwood)	0.0	0.0	0.1	0.1	0.0	0.0
Total	35.5	27.4	23.0	19.0	50.8	36.3
Total Line Length	129.9	--	121.6	--	139.6	--

Notes:
Source: Orthophotographs 2005 (Montana NRIS 2006a) interpretation of land cover in vegetation analysis area, October 2006.
-- Not applicable

H-frame structures would be the preferred structure for areas of native vegetation and would disturb approximately 36 square feet (**Table 2.3-1**) for each structure during construction. These areas would be revegetated, thus only the area occupied by structures would be impacted for the life of the Project. Operational disturbance, the actual area occupied by the poles, would be approximately 8 square feet per H-frame. Operation disturbance would include H-frame structure base disturbance, other pole base disturbance, and access road disturbance. Construction disturbance would also include assembling structure disturbance, vehicle turn-around areas disturbance, and line pulling and tensioning area disturbance, construction road disturbance, and pole installation disturbance areas. **Table 3.7-5** presents the estimated amount of operational disturbance associated with H-frame structures in native cover types by alternative. MATL (2006b) proposes to avoid riparian disturbance wherever possible; however, structures may be placed in riparian habitat. Therefore, riparian land cover is included in the analysis of ground disturbance resulting from H-frame structures (**Table 3.7-5**). Cottonwood stands were not included in the analysis due to its scarcity (**Table 3.7-4**).

TABLE 3.7-5
ESTIMATED OPERATION DISTURBANCE FOR H-FRAME STRUCTURES BY NATIVE COVER TYPE

Rangeland Cover Types	**Alternative 2**		**Alternative 3**		**Alternative 4**	
	Percent Land Cover	Operational Disturbance (square feet)[a]	Percent Land Cover	Operational Disturbance (square feet)[a]	Percent Land Cover	Operational Disturbance (square feet)[a]
Grassland/ Shrubland	25.9	2,152	17.8	1,384	35.2	3,152
Riparian	1.5	122	1.1	80	1.1	80

Notes:

a Average 660-foot span between structures and assuming 8 square feet of operational disturbance per H-frame.

Access road construction and maintenance would impact native vegetation during line construction and project maintenance. Following construction, many of the road beds would be revegetated and controlled for noxious weeds resulting in resource recovery in 3 to 5 years. During vegetation recovery the likelihood of noxious weed invasion would increase. Implementation of the proposed weed control program would greatly reduce the establishment of weed species.

The major threat to vegetation resources from maintenance activities is the introduction of noxious weed species. Project maintenance would also create minor vegetation disturbance throughout the life of the project. Vegetation would not be greatly affected by occasional trampling from maintenance vehicles; however, the resulting ground disturbance and physical plant damage provide an opportunity for weed invasion. Adherence to the proposed weed management plan would reduce the likelihood of weed establishment as a result of maintenance activities.

Estimates of total ground disturbance from construction activities indicate a total disturbance of approximately 38 acres under Alternative 2 (**Table 2.3-2**), 41 acres under

Alternative 3 (**Table 2.4-1**), and 48 acres under Alternative 4 (**Table 2.5-1**). The total acreage of construction disturbance would be more than operation disturbance. Construction disturbance would be of varying intensity, with most areas, such as staging areas, requiring reseeding. All areas of disturbance would require noxious weed monitoring and possible weed treatment.

Estimates of total ground disturbance from operation activities include approximately 6 acres for Alternative 2, 10 acres for Alternative 3, and 11 acres for Alternative 4. Short- and long-term ground disturbance is greatest under Alternative 4.

Proposed practices to reduce potential vegetation loss and noxious weed invasion would include seeding disturbed areas with appropriate weed-free seed mixes, using weed-free borrow materials, and inventorying and treating noxious weeds according to the Noxious Weed and Invasive Plant Control Plan (MATL 2006b). The combination of the proposed revegetation and weed control measures along with follow-up monitoring by DEQ would reduce the potential for native species displacement and noxious weed spread during project construction and long-term maintenance.

Riparian Vegetation

DEQ would apply its environmental specifications to the project. The specifications include the requirement that MATL avoid placing poles or roads in designated 100-year flood plains.

Weed Control

Ground disturbance and increased travel during line construction and maintenance could increase the risk of noxious weed spread. Weed infestations are actively controlled in cropland and along country roads and other rights of way; however, resources are often limited when treating weeds in native vegetation. The weed control area for this project is defined by MATL as:

> "…all lands disturbed by construction activities plus a 30-foot buffer area around disturbances. Newly constructed roadways, where needed, are expected to be about 14 feet wide with varying widths of cut and fill slopes. To buffer all disturbed areas it is estimated that the 'weed control area' will consist of an approximately 100-foot corridor along all roadways and tensioning sites that are used for construction, and all lands within 50 feet of each new transmission line structure." (MATL 2006b)

The proposed weed control program is comprehensive. It incorporates a baseline inventory and marking of existing noxious weed populations, preventative measures (that is, washing vehicles, flagging weed populations to be avoided, and seeding following disturbance), and an integrated control program involving spraying target species in coordination with the BLM, state weed coordinator, and county weed boards and groups. Mitigation practices such as washing vehicles and equipment would occur throughout construction and continue during future line maintenance activities. Furthermore, MATL would report annually to federal, state, and county personnel on the condition and progress of this effort. The MATL integrated weed control plan would reduce the threat of noxious weed invasion following ground disturbance resulting from project construction and long-term maintenance. This weed control program would be implemented for the life of the project or as required by designated federal, state, and county personnel to ensure long-term noxious/invasive plan control measures are met in the weed control area (MATL 2006b).

In addition to noxious weed invasion, unlisted weed species are likely to increase due to ground disturbance and increased traffic and activity in the study area. It is assumed MATL would treat these species in conjunction with noxious weeds. On farmland, it is assumed landowners would manage these species with the same methods currently in use.

3.8 Wildlife

3.8.1 Analysis Methods

This section discusses the occurrence and distribution of vertebrates (mammals, birds, reptiles, and amphibians) within the Project area.

Analysis Area

The analysis area includes wildlife habitat potentially impacted by the implementation of the proposed alternatives. This area was defined as one mile on either side of the proposed and alternative transmission line alignments. Figures showing the alignments are located in Chapter 2.

Information Sources

Information on the distribution of wildlife in the Project area was obtained from a variety of sources, including: literature review, reports from the NHP and FWP, technical reports, peer-reviewed journal articles, and field investigations conducted during May, June, and August 2005 and April and May 2006. Field investigations were conducted to evaluate biological resources in the vicinity of the proposed transmission line alignments. The potential for occurrence of wildlife species not observed during field investigations was assessed based upon evaluation of species distribution and habitat use and information from previous research studies and biological reports (MATL 2006b).

Threatened, endangered, candidate, and sensitive species found within the Project area are discussed in Section 3.10.

3.8.2 Affected Environment

The Project area encompasses the following Level IV ecoregions of Montana including: the North Central Brown Glaciated Plains, the Foothill Grassland, and the Milk River Pothole Upland (Woods and others 2002). Within the Project area, human development and conversion to agricultural cropland have fragmented the native vegetation communities and reduced the quality of these areas as habitat for grassland species**.** Areas such as Benton Lake NWR, WPAs, CRP lands, river corridors, and the Kevin Rim are important wildlife habitats within the Project area. The five WPAs provide habitat for wildlife, especially waterfowl (**Figure 3.6-1**). CRP lands, which comprise approximately 17.7 percent of the Project area, also provide valuable cover and forage for various species of wildlife.

The Marias and Teton rivers represent the most important fisheries in the Project area, and the associated cottonwood stands are the only sizeable woodlands in the area. The extent of a shrub-steppe community (silver sagebrush-western wheatgrass) is limited to the Kevin Rim in the northeast corner of the Project area and lands southeast of Shelby north of the Marias River.

A list of wildlife species observed during field investigations is presented in **Table 3.8-1**. This table is not intended to be an exhaustive list of every species that occurs in the area, but rather to provide insight into current habitat conditions and general taxonomic groups that occur within the Project area.

TABLE 3.8-1
SPECIES OBSERVED IN THE PROJECT AREA DURING FIELD INVESTIGATIONS

Common Name	Scientific Name	Location
Birds		
Golden eagle	*Aquila chrysaetos*	West of Benton Lake NWR
Northern harrier	*Circus cyaneus*	West of Benton Lake NWR
Swainson's hawk	*Buteo swainsoni*	West of Benton Lake NWR; Bullhead Road; Kevin Rim
Red-tailed hawk	*Buteo jamaicensis*	West of Benton Lake NWR; Bullhead Road; north of Teton River
Ring-necked pheasant	*Phasianus colchicus*	McLean State Game Preserve; Bullhead Road
Sharp-tailed grouse	*Tympanuchus phasianellus*	West of Benton Lake NWR; Marias River; north of Shelby
Horned lark	*Eremophila alpestris*	North of Marias River
Meadow lark	*Sturnella neglecta*	Throughout
Common snipe	*Gallinago gallinago*	McLean State Game Preserve
Long-billed curlew	*Numenius americanus*	Throughout
Northern shoveler	*Anas clypeata*	North of Cut Bank
Blue-winged teal	*Anas discors*	North of Cut Bank
Mallard	*Anas platyrhynchos*	North of Cut Bank
Gray (Hungarian) partridge	*Perdix perdix*	Kevin Rim; McLean State Game Preserve
Mammals		
Coyote	*Canis latrans*	South of Cut Bank
American pronghorn	*Antilocapra americana*	Throughout
White-tailed jackrabbit	*Lepus townsendii*	Kevin Rim
Red fox	*Vulpes vulpes*	Bullhead Road
Mountain cottontail	*Sylvilagus nutalli*	Kevin Rim
Mule deer	*Odocoileus hemionus*	North of Teton River

Notes:
Source: MATL 2006b

3.8.2.1 Mammals

Mammal species found in the grasslands within the Project area are numerous and include mule deer, American pronghorn, badger (*Taxidea taxus*), Richardson's ground squirrel (*Spermophilus richardsonii)*, coyote, mountain cottontail and white-tailed jackrabbit (*Lepus townsendii*), and a variety of small rodents. These species are relatively common in grassland and sagebrush steppe habitats in northcentral Montana.

Badgers occur at low densities in grasslands throughout the Project area. Richardson's ground squirrel occurs in relatively low to moderate densities (Olson 2005a) within the Project area, including several active ground squirrel burrows in the Kevin Rim area (Zelenak 1996). Black-tailed prairie dogs (*Cynomys ludovicianus*) also occur in the Project area east of Interstate 15 and are further discussed in Section 3.10. Riparian habitats along the Marias River and Teton River support additional mammal species, including raccoons (*Procyon lotor*), red fox, and a variety of small rodents.

Ungulates

Mule deer occur in the Project area south of the Marias River in low to moderate densities along coulees and draws and irrigated lands east of Conrad. **Figures 3.8-1**, **3.8-2**, and **3.8-3** illustrate the winter distribution of mule deer within or adjacent to the Project area. The NHP Animal Field Guide indicates that white-tailed deer (*Odocoileus virginianus*) are generally restricted to the southern portion of the Project area, not reaching as far north as the Marias River (NHP 2004). However, landowners along the Marias River reported observing white-tailed deer in this area. The NHP Animal Field Guide reports that within the southern portion of the Project area, white-tailed deer stay close to riparian habitats along the Teton River and its tributaries. Data indicate that white-tailed deer do not have winter ranges within the Project area; however, the species' range east of the continental divide varies greatly from year to year depending on climatic conditions (Montana NRIS 2005).

American pronghorn occur in low to moderate densities throughout the central and southern portions of the Project area. Pronghorn were observed in grasslands, sagebrush steppe, and croplands during field investigations. NHP data indicate that pronghorn do not have a winter distribution within the Project area (Montana NRIS 2005); however, pronghorn populations tend to fluctuate with environmental conditions. NHP and FWP data indicate that elk (*Cervus elaphus*) do not generally occur within the Project area. The closest elk population is northeast of Shelby, outside the Project area, in the Sweetgrass Hills.

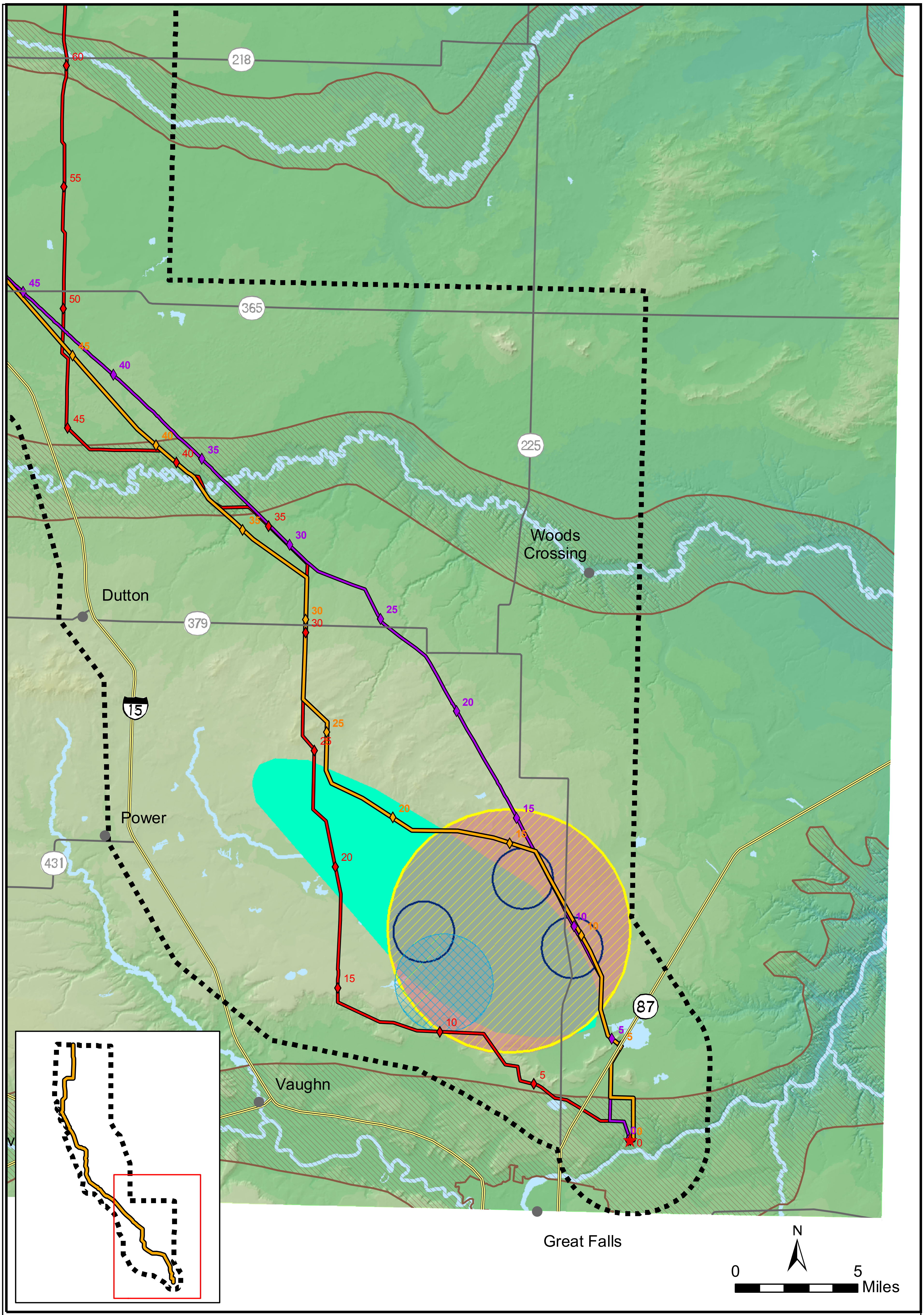

218
365
225
379
15
431
87
Woods Crossing
Dutton
Power
Vaughn
Great Falls
60
55
50
45
40
35
30
25
20
15
10
5
0
N
0
5
Miles

FIGURE 3.8-1
PROPOSED MATL POWERLINE MULE DEER WINTER RANGE AND SPECIES OF SPECIAL CONCERN SOUTH

LEGEND

- ▨ MULE DEER WINTER RANGE (MTFWP)
- 🟥 BLACK-CROWNED NIGHT-HERON (Nycticorax nycticorax)
- ▨ BLACK-NECKED STILT (Himantopus mexicanus)
- ○ BURROWING OWL (Athene cunicularia)
- 🟩 FERRUGINOUS HAWK (Buteo regalis)
- ▨ PEREGRINE FALCON (Falco peregrinus)
- ▨ SHARPTAIL GROUSE LEKS PROTECTION BUFFER AREA
- ALT2 - ALIGNMENT
- ◆ MILE MARKERS
- ALT3 - ALIGNMENT
- ◆ MILE MARKERS
- ALT4 - ALIGNMENT
- ◆ MILE MARKERS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY_AREA
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

GIS map by Patricia Williams -TTMTI 3-8-1-MuleDeerWinterRng-TnESpp-South.mxd

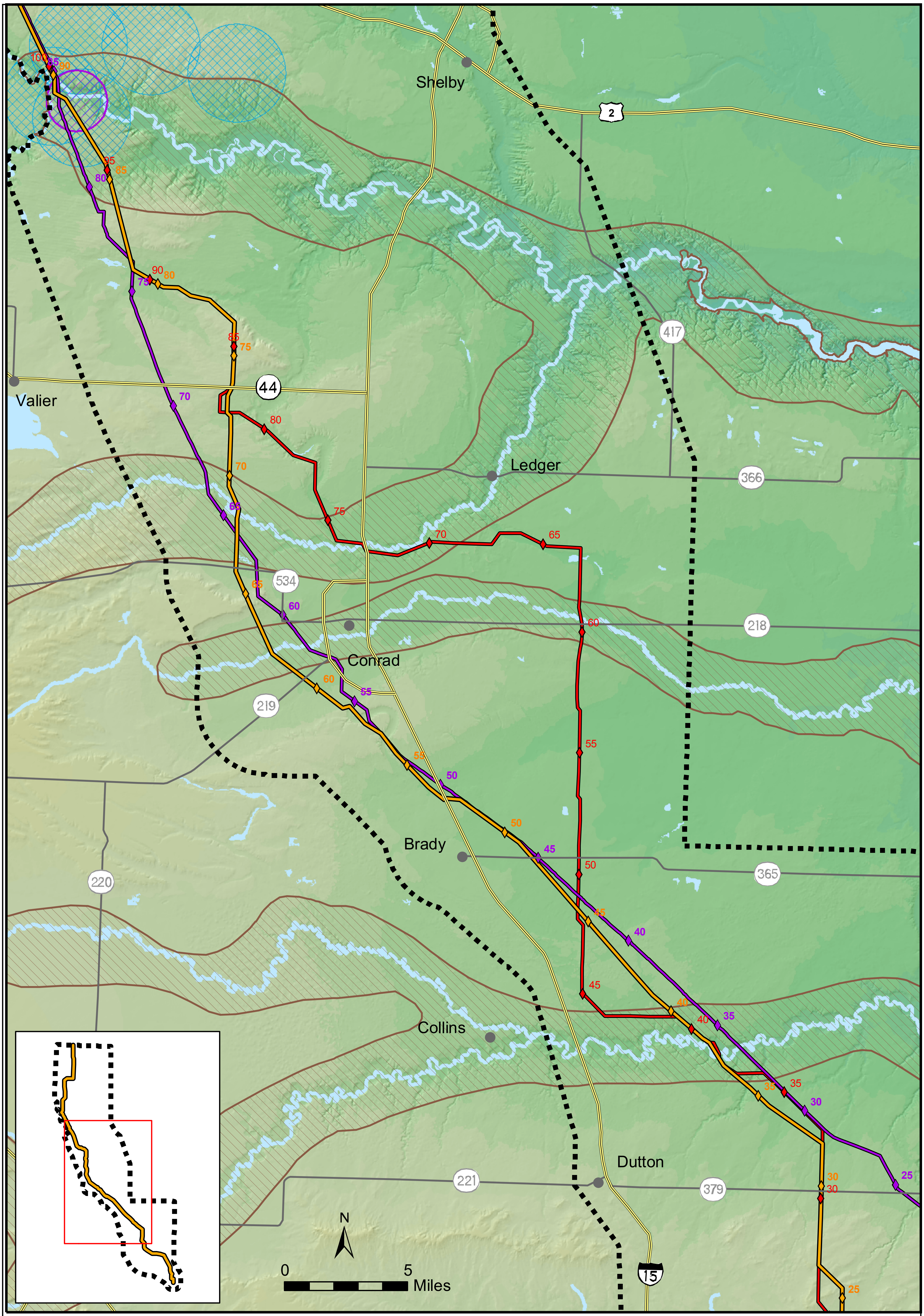

Shelby
2
417
Valier
44
Ledger
366
534
218
Conrad
219
Brady
365
220
Collins
Dutton
221
379
15
N
0
5
Miles
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25

FIGURE 3.8-2
PROPOSED MATL POWERLINE
MULE DEER WINTER RANGE AND
SPECIES OF SPECIAL CONCERN
MIDDLE

LEGEND
▨ MULE DEER WINTER RANGE (MTFWP)
🟥 BLACK-CROWNED NIGHT-HERON (Nycticorax nycticorax)
▨ BLACK-NECKED STILT (Himantopus mexicanus)
☐ BURROWING OWL (Athene cunicularia)
🟩 FERRUGINOUS HAWK (Buteo regalis)
▨ PEREGRINE FALCON (Falco peregrinus)
▨ SHARPTAIL GROUSE LEKS PROTECTION BUFFER AREA
ALT2 - ALIGNMENT
◆ MILE MARKERS
ALT3 - ALIGNMENT
◆ MILE MARKERS
ALT4 - ALIGNMENT
◆ MILE MARKERS
● CITIES AND TOWNS
★ ALIGNMENT END AND EXIT POINTS
STUDY_AREA
MAJOR_HIGHWAYS
SECONDARY_ROADS
RIVERS AND STREAMS

GIS map by Patricia Williams -TTMTI 3-8-2-MuleDeerWinterRng-Middle.mxd

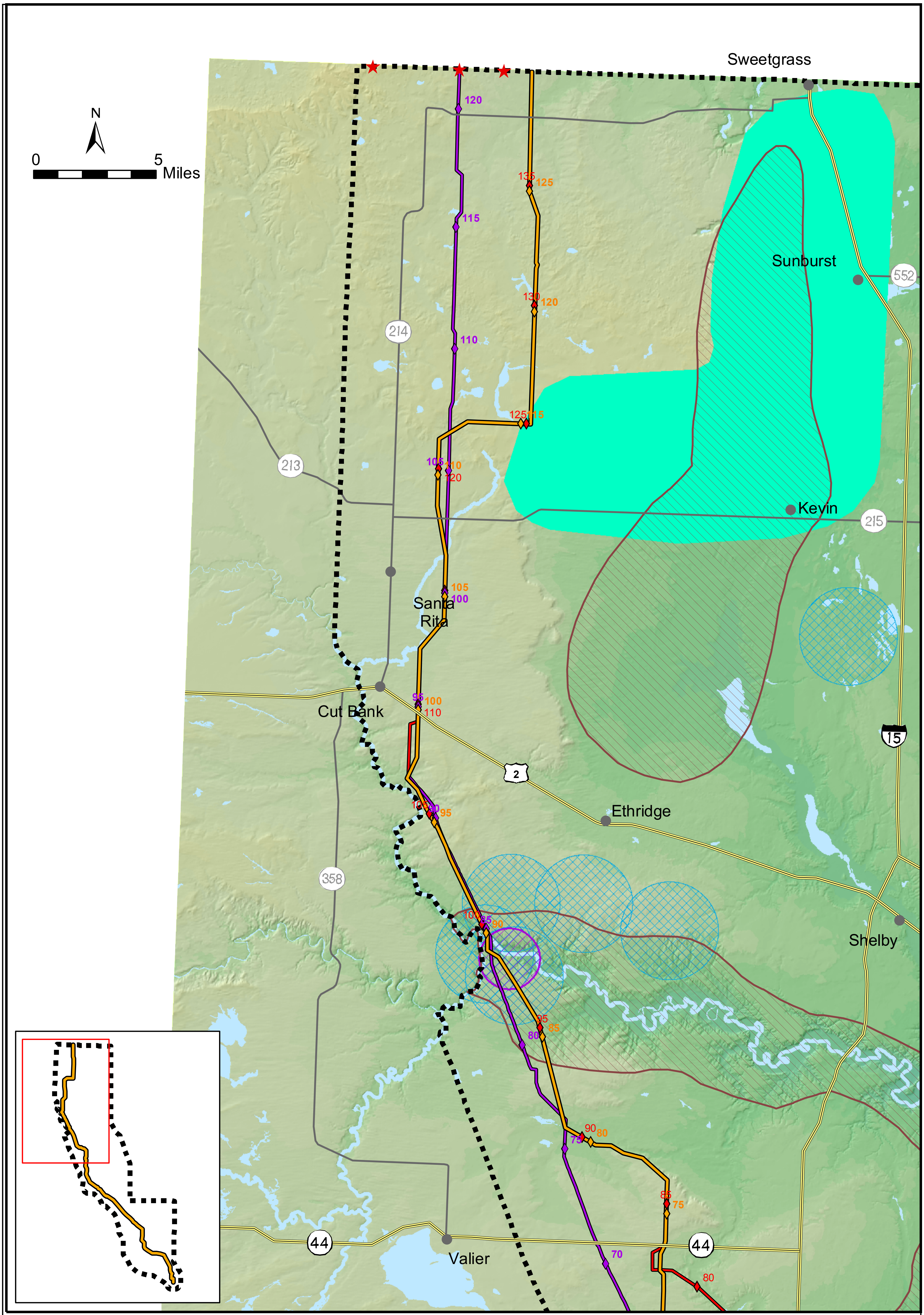

Sweetgrass
N
0
5
Miles
120
115
110
135
125
130
120
125
115
214
213
105
110
120
Sunburst
552
Kevin
215
105
100
Santa Rita
Cut Bank
95
100
110
15
2
Ethridge
105
90
95
358
100
85
90
Shelby
85
85
80
90
80
75
85
75
44
Valier
70
44
80
MULE DEER WINTER RANGE (MTFWP)
BLACK-CROWNED NIGHT-HERON (Nycticorax nycticorax)
BLACK-NECKED STILT (Himantopus mexicanus)
BURROWING OWL (Athene cunicularia)
FERRUGINOUS HAWK (Buteo regalis)
PEREGRINE FALCON (Falco peregrinus)
SHARPTAIL GROUSE LEKS PROTECTION BUFFER AREA
LEGEND
ALT2 - ALIGNMENT
MILE MARKERS
ALT3 - ALIGNMENT
MILE MARKERS
ALT4 - ALIGNMENT
MILE MARKERS
CITIES AND TOWNS
ALIGNMENT END AND EXIT POINTS
STUDY_AREA
MAJOR_HIGHWAYS
SECONDARY_ROADS
RIVERS AND STREAMS

FIGURE 3.8-3
PROPOSED MATL POWERLINE
MULE DEER WINTER RANGE AND
SPECIES OF SPECIAL CONCERN
NORTH

GIS map by Patricia Williams -TTMTI 3-8-3-MuleDeerWinterRng-North.mxd

Bats

The Project area is within the known range of eight species of bats, representing one family and five genera (**Table 3.8-2**). All are insectivorous, preying upon nocturnal insects using highly evolved echolocation and foraging behavior. Bats use grasslands and riparian areas as foraging habitat. Some species are migratory, flying south for the winter (for example, the hoary bat and silver-haired bat), while others flock to local caves or mines for the lengthy winter hibernation (for example, Myotis spp. and the big brown bat). Migratory and wintering habits are poorly understood for many species. Townsend's big-eared bat is classified as a sensitive species by BLM and has a State rank of S2. The NHP did not have element occurrence data for this particular species of concern within the Project area.

TABLE 3.8-2
BAT SPECIES LIKELY TO OCCUR IN THE PROJECT AREA[a]

Common Name	Scientific Name	Roosting Habitat[b]	Status[c]	Migration[d]
Silver-haired bat	*Lasionycteris noctivagans*	Tree cavities in mature coniferous/mixed forest	C	Migratory
Hoary bat	*Lasiurus cinereus*	Trees	C	Migratory
Big brown bat	*Eptesicus fuscus*	Tree cavities, buildings	C	Not known
Townsend's big-eared bat	*Corynorhinus townsendii*	Caves, abandoned mines	U	Year-round resident
Western small-footed myotis	*Myotis ciliolabrum*	Caves, abandoned mines, rock crevices	U	Not known
Long-eared myotis	*Myotis evotis*	Tree cavities and exfoliating bark in mature conifers	U	Not known
Little brown myotis	*Myotis lucifugus*	Buildings, trees, rock crevices	C	Probably migratory
Long-legged myotis	*Myotis volans*	Trees, buildings, rock crevices	U	Probably migratory

Notes:

Source: MATL 2006b

a Based upon NHP distribution data

b Primary hibernacula and roost habitats used by the species (Bat Conservation International 2002).

c General abundance/distribution in North America: C= common, U=uncommon (Bat Conservation International 2002).

d Current knowledge of migration status (Genter and Jurist 1995).

Due to local geologic and physiographic conditions, few if any caves or abandoned mines occur in the Project area. Rock faces/crevices are found sparingly along parts of the Marias River and along the Kevin Rim. Accordingly, Townsend's big-eared bat and western small-footed myotis are unlikely to roost in the Project area. Furthermore, the Project area is at the distributional limits for these species, and suitable roosting habitat does not exist in the area, thus the potential for occurrence of these species is relatively low. In addition, the only known location of Townsend's big-eared bat north of the Missouri River in northeastern Montana is in the Little Rocky Mountains approximately 130 miles to the east (Hendricks 2000).

The cottonwood stands along the Marias River and Teton River represent potential roosting habitat for those species that roost in tree cavities and exfoliating bark. These species may occur in low densities given the limited availability of forested habitats within the Project area. Habitat generalists, such as the big brown bat, little brown myotis or the long-legged myotis, are likely to be the most abundant bat species in the area given their capacity to use both natural and man-made structures for day and night roosts. No roosts or hibernacula are known to occur in the vicinity of the Project area.

3.8.2.2 Birds

The vegetative communities provide habitat for a number of migratory and resident bird species within the Project area. These species can generally be classified as upland game birds, grassland birds, waterfowl and shore birds, and raptors. The Marias River and Teton River cottonwood stands represent the only large tracts of relatively contiguous forests in the Project area and provide potential habitat for bird species that use forested and riparian habitats. The prairie grasslands along the river breaks and coulees provide potential habitat for a number of obligate grassland species. The five WPAs, Benton Lake NWR, and various prairie potholes provide potential habitat for waterfowl and shore birds.

Upland Game Birds

Upland game bird species known to occur in the Project area include: the ring-necked pheasant, the gray (Hungarian) partridge, and the sharp-tailed grouse. Ring-necked pheasant and gray partridge habitat consists of a mosaic of open grasslands, cropland, and brushy cover. Extensive tracts of prairie grassland do not provide good pheasant habitat (Mussehl and Howell 1971). Pheasants occur throughout the Project area, but primarily within the vicinity of waterways.

Although the greater sage grouse (*Centrocercus urophasianus*) is classified as sensitive by the BLM and sharp-tailed grouse is considered uncommon by the State, they are currently considered game species by FWP and are subject to a legal harvest season. Generally, the greater sage grouse is a sagebrush obligate that relies on big sagebrush habitats in all seasons. Due to the low occurrence of big sagebrush habitat (see Section 3.7.2), distribution data indicate that sage grouse do not occur within the Project area. The closest distribution of sage grouse is near Tiber Reservoir along the Marias River, approximately 30 miles east of the study area.

Sharp-tailed grouse inhabit grasslands interspersed with woody draws and shrub coulees. The entire Project area contains potential habitat for sharp-tailed grouse (Montana NRIS 2005). Except for areas close to the Marias River, Teton River, and Benton Lake NWR, the Project area contains lower quality sharp-tailed grouse habitat due to habitat loss and fragmentation associated with agricultural activities. During field investigations a total of seven sharp-tail leks (courtship display areas) were recorded. Three of the leks were observed visually and four leks were only identified by sound. Although FWP did not have specific locations of leks, it identified water crossings, draws, and coulees that are not cultivated as probable locations for leks within the Project area, specifically Benton Lake NWR, Cut Bank Creek breaks (including where the Two Medicine River and Cut Bank Creek come together to form the Marias River), Teton River, east of Dutton along coulees and draws, Big Flat Coulee, the Dry Fork of the Marias River, and the Kevin Rim (Olson 2005a).

Grassland Birds

The intact mid- and shortgrass prairie communities along the Marias River, Teton River, and several draws and coulees within the Project area have been subjected to light to moderate grazing intensities and represent relatively high quality wildlife habitat. Several obligate grassland species may potentially occur in the aforementioned areas. FWP identified the following grassland birds as having the potential to occur:

- McCown's longspur (*Calcarius mccownii*);
- Mountain plover (*Charadrius montanus*);
- Sprague's pipit (*Anthus spragueii*);
- Chestnut collared longspur (*Calcarius ornatus*); and
- Baird's sparrow (*Ammodramus bairdii*).

None of the aforementioned species was observed during field investigations. All five of these species are identified by the state as species of concern. Baird's sparrow was identified by the NHP as known to occur within the Project area and is discussed further in Section 3.10. The quality and relative intactness of the grassland prairie habitats declines with distance away from the Marias and Teton rivers due to increasing agricultural land uses.

Waterfowl and Shore Birds

Several waterfowl species are known to occur in the Project area, the majority of which have been observed on Benton Lake NWR (**Figure 3.6-1**). Breeding bird surveys on Benton Lake NWR have documented 20 species of ducks, including 12 species that stay to nest on the refuge (FWS 2000). These species likely use areas adjacent to the refuge for foraging. Birds have been documented to migrate into the refuge from all directions and no specific migratory pathways or low-level flight feeding pathways have been identified (Johnson 2005). Waterfowl habitat within the Project area includes wetlands, stock ponds, the Marias River, and the Teton River. Wetlands and stock ponds tend to be small and isolated. Since most stock ponds lack emergent and/or wetland vegetation, nesting habitat is limited. Surface waters that possess potential nesting habitat include Benton Lake, Hay Lake, Grassy Lake, five WPAs, and a few of the larger, undisturbed prairie potholes. The Marias and Teton rivers also provide waterfowl habitat, although hydrological changes and channel incision have reduced the availability of quality nesting habitat along both rivers. Riparian communities along ephemeral streams that bisect the Project area do not provide quality waterfowl habitat. Wetlands, stock ponds, Hay Lake, Marias and Teton rivers, and Benton Lake NWR also provide stopover habitat for migrating waterfowl.

Approximately 32 species of shore birds are known to occur in the Project area, primarily on Benton Lake NWR (**Table 3.8-3**). These species nest in native grassland prairie habitats in proximity to mesic grasslands or shallow wetlands. Habitat for these species occurs primarily in the northern and central portions of the Project area where native prairie grasslands are interspersed with small ponds, wetlands, and riparian areas. Habitat for other shore bird species includes the wetlands and stock ponds that are dispersed throughout the Project area. With the exception of Hay Lake, the small size and lack of emergent wetland vegetation in most of the water bodies reduces their quality as shore bird habitat. The Marias and Teton rivers and adjacent areas also represent potential shore bird habitat.

TABLE 3.8-3
WATERFOWL AND SHORE BIRDS SIGHTED ON BENTON LAKE NWR SINCE 1961

Shore birds	Swans, Geese, and Ducks
Black-bellied Plover	Tundra Swan (Whistling Swan)
American Golden Plover (Lesser Gol-Pl.)	Trumpeter Swan
Semi-palmated Plover	Greater White-fronted Goose
Piping Plover	Snow Goose
Killdeer	Ross' Goose
Black-necked Stilt	Canada Goose
American Avocet	Wood Duck
Greater Yellowlegs	Green-winged Teal
Lesser Yellowlegs	American Black Duck
Solitary Sandpiper	Mallard
Willet	Northern Pintail
Spotted Sandpiper	Blue-winged Teal
Upland Sandpiper	Cinnamon Teal
Whimbrel	Northern Shoveler
Long-billed Curlew	Gadwall

TABLE 3.8-3 (Continued)
WATERFOWL AND SHORE BIRDS SIGHTED ON BENTON LAKE NWR SINCE 1961

Shore birds	Swans, Geese, and Ducks
Hudsonian Godwit	Eurasian Wigeon
Marbled Godwit	American Wigeon
Ruddy Turnstone	Canvasback
Red Knot	Redhead
Sanderling	Ring-necked Duck
Semipalmated Sandpiper	Greater Scaup
Western Sandpiper	Lesser Scaup
Least Sandpiper	Oldsquaw
Baird's Sandpiper	White-winged Scoter
Pectoral Sandpiper	Common Goldeneye
Dunlin	Barrow's Goldeneye
Stilt Sandpiper	Bufflehead
Short-billed Dowitcher	Hooded Merganser
Long-billed Dowitcher	Common Merganser
Common Snipe	Red-breasted Merganser
Wilson's Phalarope	Ruddy Duck
Red-necked Phalarope	

Note:

Source: MATL 2006b

Raptors

A number of raptor species are known to occur in the Project area and have been observed during breeding bird surveys and field investigations conducted for this project. The Kevin Rim Area of Critical Environmental Concern and the Marias River breaks provide potential habitat for raptors. A list of raptors observed by other researchers along Kevin Rim from 1993-1994 is presented in **Table 3.8-4** (Zelenak 1996).

While these species are present in the Project area during breeding season, potential nesting sites, aside from Kevin Rim and the bluffs around the Marias River, are limited to small shrubs in draws and coulees, riparian cottonwood trees, and ornamental spruce trees near farms or residential areas (Olson 2005a). A historic peregrine falcon eyrie is located where Cut Bank Creek and Two Medicine River flow together to form the Marias River. The eyrie is discussed further in Section 3.10. Intermittent cottonwood stands along the Marias and Teton rivers are used by bald eagles during the winter, and indirect evidence of breeding has been observed in these areas (NHP 2005). Bald eagles and peregrine falcons are often seen in the spring on Benton Lake NWR (FWS 2000).

TABLE 3.8-4
RAPTORS OBSERVED AT THE KEVIN RIM, 1993-1994[a]

Common Name	Scientific Name
Ferruginous hawk	*Buteo regalis*
Prairie falcon	*Falco mexicanus*
American kestrel	*Falco sparverius*
Red-tailed hawk	*Buteo jamaicensis*
Golden eagle	*Aquila chrysaetos*
Swainson's hawk	*Buteo swainsoni*
Great-horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Northern harrier	*Circus cyaneus*
Short-eared owl	*Asio flammeus*

Notes:
Source: MATL 2006b
[a] Source: Zelenak 1996

Potential raptor prey sources include colonial rodents, lagomorphs, waterfowl, young grouse, and carrion. Although prey populations in the Project area have not been assessed, prey densities are generally low (Olson 2005a). Ground squirrels comprised the majority of prey items recorded in ferruginous hawk nests in 1993 and 1994, followed by lagomorphs and birds (Zelenak 1996). A black-tailed prairie dog town is known to exist east of Interstate 15 southeast of Shelby north of the Marias River. Rabbits and hares are common and, while these populations are subject to large annual fluctuations, field investigations indicated that current lagomorph densities are relatively low. The five WPAs provide waterfowl concentration areas, which may serve as raptor prey sources. Carrion is available on ungulate winter ranges where bald eagles and other scavengers are attracted to the area by over-winter mortalities (Olson 2005a). Dead livestock may also provide carrion for scavenging raptors.

Migratory Birds

The Project area contains rolling hills, gentle ridges, and plateaus bisected by small drainages. There are no obvious "funnels," such as prominent ridgelines or mountain gaps that could potentially serve as a large scale or regional migratory pathway. The relatively small ridges within the Project area may serve as local pathways for birds passing through as part of a large, broad front migration. Thousands of tundra swans, and snow and Ross' geese stop at the Benton Lake NWR for a week or more on their migration from their wintering grounds in central California to nesting areas in arctic Alaska and Canada. Twenty species of ducks, including 12 species that stay to nest on the Refuge, also migrate through this area. Aside from Benton Lake NWR, a limited amount of stopover habitat for migrating waterfowl is available within the Project area (Johnson 2005). Riparian habitats can also provide stopover habitat for neotropical migrants. Examples of neotropical migrant birds include species of plovers, terns, hawks, cranes, warblers, and sparrows.

3.8.2.3 Reptiles and Amphibians

Although fragmented by agricultural cropland, the upland, riparian, and aquatic communities within the Project area may provide habitat for a variety of reptile and amphibian species. Field surveys were not conducted specifically for reptiles and amphibians during the spring and summer 2005; however, species distribution information suggests that 10 reptile and amphibian species are likely to occur in the Project area (FWS 2000). **Table 3.8-5** presents a list of reptiles and amphibians that are likely to occur based upon observations of habitat during field investigations, the Benton Lake NWR wildlife list, previous NHP field studies, and the NHP Animal Field Guide database. The greater short-horned lizard is classified as a sensitive species by BLM and has a State rank of S3. The NHP did not have element occurrence data for this particular species of concern within the Project area. The species listed in **Table 3.8-5** occupy a broad range of habitat types, ranging from ponds to mesic grasslands to xeric uplands, and may occur in appropriate habitats throughout the Project area. No known critical breeding habitats or hibernacula for any reptile or amphibian species occur within the Project area.

3.8.3 Environmental Impacts

For impacts of alternatives, the analysis focuses on assemblages of species that are of concern for reasons of public importance, sensitivity to disturbance, or regulatory issues. Potential impacts were determined mainly based upon the habitat type crossed, and the known (that is, mule deer winter range) or potential (that is, sharp-tailed grouse leks) sensitive wildlife resources within that habitat type. Short-term direct impacts on wildlife resources would include loss of individuals during construction or direct disturbance of species during critical periods in their life cycles. Long-term direct impacts could include alteration and/or fragmentation of habitat, electrocutions, and collisions. Indirect impacts could include fragmentation and disturbance caused by providing access to areas not previously accessible.

3.8.3.1 Alternative 1 – No Action

Under the No Action alternative, the proposed Project would not be implemented. Existing electrical transmission service would be maintained and operated at its current level. Selection of the No Action alternative would not result in any construction or operations of additional transmission lines within the project area; thus, no impacts to wildlife or their habitat would occur.

TABLE 3.8-5
REPTILE AND AMPHIBIAN SPECIES LIKELY TO OCCUR IN THE ANALYSIS AREA[a]
MONTANA ALBERTA TIE LTD., LETHBRIDGE, AB – GREAT FALLS, MT

Common Name	Scientific Name	Habitat
Reptiles		
Short-horned lizard[b]	*Phrynosoma hernandesi*	Sparse, short grass and sagebrush habitats with exposed soils or rock
Racer	*Coluber constrictor*	Open habitats, particularly common in short-grass prairie
Gopher snake	*Pituophis catenifer*	Arid sagebrush and grassland habitats
Western Rattlesnake	*Crotalus viridis*	Open, arid habitats with south-facing slopes and rock outcrops
Common Garter Snake	*Thamnophis sirtalis*	Numerous, prefer moist habitats along streams and ponds
Western Terrestrial Garter Snake	*Thamnophis elegans*	Nearly all habitats
Plains Garter Snake	*Thamnophis radix*	Numerous, including short-grass prairie near water (ponds and coulees)
Amphibians		
Tiger Salamander	*Ambystoma tigrinum*	Breeds in ponds and streams; burrows in prairie or agricultural habitats
Western Chorus Frog	*Pseudacris triseriata triseriata*	Mesic grasslands and marshes near ponds and small lakes
Painted Turtle	*Chrysemys picta*	Lakes, ponds, reservoirs, and sloughs that contain some shallow water areas and a soft bottom; also river backwaters and oxbows with little current

Notes:
Source: MATL 2006b
[a] Source: NHP 2004.
[b] BLM: Sensitive; State rank: S3 - potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.

3.8.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Potential adverse impacts on wildlife associated with development of the transmission line can be separated into impacts associated with project construction (short term) and those related to operations and maintenance (long term). The primary potential impacts include direct mortality, habitat loss and fragmentation, disturbance and displacement of individual animals, interference with behavioral activities, and disturbance resulting from increased public access.

Short-term Impacts

Installation and development of the proposed transmission line could cause direct injury or mortality to wildlife species within the Project area. Activities such as site clearing and grading, construction of access roads and support facilities, and off-road travel during construction could impact wildlife species. Species with higher likelihood to be impacted would include species with limited mobility, species that burrow, or avian species, as nests/burrows could be destroyed during project construction. Construction related disturbances would be short term (6 to 7 months) and confined to the construction site or adjacent storage areas.

Disturbance associated with the installation and development of the transmission line would result in some habitat loss and fragmentation. Project construction activities such as site clearing, site grading, and development of access roads and support facilities would result in a temporary loss of approximately 38 to 48 acres of potential habitat for species within the Project area, depending on the action alternative (MATL 2006b). While a portion of disturbed areas would be reclaimed upon completion of construction activities, permanent habitat loss would occur within the footprints of support structures, and access roads.

Project construction activities would result in disturbance and behavioral interference. Noise, fugitive dust, and activities associated with site clearing and grading, installation of support structures, construction of access roads and support facilities, and associated equipment could disturb and displace wildlife within and adjacent to impact areas. All wildlife species within or near impact areas would be susceptible to disturbance and disturbance would have the greatest impact during migration and breeding seasons. Some species with small home ranges or limited dispersal ability might experience a greater impact. These disturbances would be short term (6 to 7 months) and concentrated within the activity area.

The project construction activities could also result in accidental exposure to contaminants or fire, or increased legal and illegal killing of wildlife. Accidental spills during equipment maintenance or refueling could result in temporary exposure to hazardous contaminants. However, spill prevention plans would be in place and impacted areas would be immediately reclaimed. In addition, exposure would be temporary and restricted to the site of spill; thus, impacts on wildlife would be unlikely. Accidental fires associated with construction and maintenance vehicles would result in the temporary loss of habitat. The increased public access as a result of increased access roads may result in additional legal hunting and poaching. However, this is not expected to increase the level of hunting in the region, only potentially increase access.

Long-term Impacts

Collisions

Direct impacts to avian species could occur as a result of collisions with the proposed transmission line. Operation of the proposed transmission line would have the greatest impact on bird species, due to the collision threat posed by structures, transmission lines, and ground wires. Most other wildlife would not be as impacted, since the presence of the transmission line, structures, and access roads generally do not present barriers to migration, create excessive noise, or otherwise cause major behavior changes.

A variety of factors influence avian transmission line collisions: configuration and location of transmission lines; specific avian species and their tendency to collide with transmission lines; and the environment, such as weather, topography, and habitat (Avian Power Line Interaction Committee [APLIC] and FWS 2005). Line placement with respect to other structures and topography can influence the collision rate of a transmission line. Collisions usually occur near water or migration corridors and more often during inclement weather. Less agile birds, such as heavy-bodied birds or birds within flocks, are more likely to collide with overhead lines as they lack the ability to quickly negotiate obstacles. Some bird species, usually waterfowl, are prone to collisions with power lines, especially the grounding wires located at the top of the structures (Meyer 1978, James and Haak 1979, Beaulaurier 1981, Beaulaurier et al. 1982, Faanes 1987). Raptor species are less likely to collide with power lines, perhaps due to their excellent eyesight and tendency to not fly at dusk or in low visibility weather conditions (Olendorff et al. 1981). Smaller migratory birds are at risk, but generally not as prone to collision because of their small size, ability to quickly maneuver away from obstacles, and because they often migrate high enough above the ground to avoid transmission lines. Permanent-resident birds that fly in tight flocks, particularly those in and near wetland areas, may be at higher risk than other species.

The action alternatives would implement environmental protection measures that would reduce the potential for avian collisions. Areas with a higher likelihood for avian collisions, such as known flyways, were avoided. In addition, MATL would apply *Suggested Practices for Raptor Protection on Power Lines*, developed by the EEI and APLIC (1996), as appropriate, during design and construction of overhead structures and the substation additions. Avian collisions would be reduced as approved line marking devices would be installed every 50 feet on overhead ground wires within all stream, river and wetland crossings, such as crossings of the Marias River, the Dry Fork Marias River, Teton River, east of the Benton Lake NWR boundary. Line marking devices would also be placed every 50 feet within a ¼ mile buffer on either side of streams, rivers, or wetlands. Monitoring of potential problem areas after construction would ensure that line markers are functioning properly.

Electrocutions

New transmission lines could potentially impact large birds, such as raptors through electrocution. Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device. Two factors influence the potential for avian electrocution: environmental factors such as topography, vegetation, available prey and behavioral factors; and inadequate separation between energized conductors and grounded hardware can provide two points of contact (APLIC and FWS 2005). MATL transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution. MATL's line would entail "avian- safe" structures, which provide adequate clearance to accommodate a large bird between energized and/or grounded parts. These structures typically have 60 inches of horizontal separation, which can accommodate the wrist-to-wrist distance of an eagle. In addition, vertical separation of at least 48 inches can accommodate the height of an eagle from its feet to the top of its head (APLIC and FWS 2005).

Increased Predation

Impacts as a result of the proposed transmission line could occur from increased raptor predation within the areas surrounding the support structures. In areas where suitable prey habitat is within view, perch sites can provide an energy efficient method for hunting. There is the concern that raptors may use the horizontal cross arms of H-frame transmission structures or single pole structures as perches while scouting for food. Concerns have been raised in some circumstances that the raptors could impact the prairie nesting bird populations due to this. The proposed segments do not go through any major prairie bird nesting area and the segments that have been identified to come within 2 miles of an identified lek would have perch guards installed on support structures in order to deter raptor perching. The 2-mile radius has been identified by FWP biologists (Northrup 2006) and peer reviewed management guidelines (Connely et al. 2000) as an adequate buffer area to ensure that leks would be protected from an increase in raptor predation.

Impacts to Species Assemblages

All action alternatives would cross through similar habitat types with predominantly agricultural lands and scattered grasslands. Impacts to specific assemblages of wildlife species are discussed below. Because only minor differences occur between the action alternatives, impacts are discussed together with differences addressed within the discussion.

Big Game Species

Impacts on big game species would not be expected. Pronghorn and mule deer does with fawns could be displaced by activities during late spring and early summer, but disturbance within a given portion of the line would be temporary and animals could easily use adjacent habitat during disturbance periods. Activities would not disturb wintering animals as the construction activities would occur during the spring and summer months. In the event that activities would occur within the winter months, animals could be disturbed and potentially displaced; however, disturbance within a specific area would be temporary. The proposed and alternative transmission line alignments would cross through mule deer winter range and there would be some permanent loss of habitat as a result of structures and access roads (see **Table 3.8-6).**

This habitat loss would not impact mule deer as this is a minor loss relative to the amount of available habitat within the region.

TABLE 3.8-6 MULE DEER WINTER RANGE IMPACTED BY ALTERNATIVES			
Mule Deer Winter Range	Alternative		
	2	3	4
Linear Miles of Mule Deer Winter Range Bisected by Transmission Line	19	20	28

Sharp-tailed Grouse

Potential sharp-tailed grouse habitat along alternative alignments is patchy due to fragmentation by agricultural land. The primary suitable habitat is within the grasslands above the Marias River where two leks were observed and two leks were identified by sound. In total, three leks are within the 2-mile buffer area of the alignments. Although no leks were observed above the Teton River during field investigations, the area where the action alternatives would cross the Teton is potential sharp-tailed grouse habitat.

Impacts on sharp-tailed grouse leks could potentially result from disturbance during the breeding season in April and early May, and to nesting hens during May and early June. However, based on MATL's commitment to curtail construction in any sharp-tailed grouse nesting habitat during the nesting season and to use raptor perch deterrents as appropriate, few impacts to breeding sharp-tailed grouse would occur from implementation of the alternatives. Based on consultation with the FWP (Northrup 2006) and the "Guidelines for management of sage grouse populations and habitats" (Connely at al. 2000), all support structures that would cross within the 2-mile buffer area around the documented leks would be fitted with raptor perch deterrents to reduce predation. For all action alternatives, this would result in approximately 73 support structures (11 miles of transmission line) to be fitted with raptor perch deterrents.

Raptors

Raptor nest surveys conducted along the action alternative alignments showed no raptor nests occurring within one-half mile of the alignments. Nesting habitat occurs in cottonwood groves found along the Marias and Teton rivers and in ornamental trees found near residences, generally greater than 1 mile away from the alignments (Olson 2005b). Impacts to raptors would not be expected and, in the event that a raptor nest was identified during construction activities, MATL would consult with the FWP and take precautions to minimize impacts on nesting raptors.

Migratory Birds

Disturbance to migratory birds from noise, vehicles, and human presence during construction would be localized and of short duration. Bird nests could be destroyed if birds are nesting within the disturbed areas. However, many of the birds would re-nest if the first attempt were unsuccessful. No long-term impacts associated with operating and maintaining the line would occur.

Wetlands are an essential component of waterfowl nesting habitat and nesting can occur up to a mile from wetlands (Ringelman 1992). Alternative alignments would not come within 1 mile of any of the five WPAs or any known nesting colonies in the Project study area. Peterson WPA, located in Glacier County northwest of Hay Lake, is approximately 1.7 miles from the Alternative 2 alignment and 1.4 miles from the Alternative 3 alignment. Nesting colonies of white pelicans, great blue herons, or double-crested cormorants are not known to occur within a one-mile buffer area of any of the alternative alignment (Olson 2005b and Johnson 2005). Waterfowl nesting tends to be concentrated within uplands adjacent to wetlands (Ringelman 1992), thus, the construction and operation of the transmission line would not impact waterfowl nesting associated with the WPAs.

The alignments cross land to the east and west of Benton Lake NWR. Alternative 2 and 4 routes are approximately 0.9 mile away from Benton Lake, while Alternative 3 is 0.8 mile away. Birds approach Benton Lake NWR during spring and fall migration.

3.9 Fish

3.9.1 Analysis Methods

The following section discusses the occurrence and distribution of fish species within the Project area. Threatened, endangered, candidate, and sensitive fish species found within the Project area are discussed in Section 3.10.

Analysis Area

The analysis area includes all fish bearing waterways within the MFSA application Project study area (**Figure 1.1-1**). These waterways include: the Missouri River, the Marias River, the Teton River and their associated tributaries, and several man-made stock ponds and reservoirs.

Information Sources

Information on fisheries within the Project area was obtained from a variety of sources, including: literature review, reports from the NHP and FWP, technical reports and peer-reviewed journal articles. Species lists, valuable information, and mapping of sensitive species and important habitats were obtained through meetings and correspondence with personnel from the FWS and FWP (MATL 2006b).

3.9.2 Affected Environment

The Project area crosses one sub-basin of the Milk Watershed and seven sub-basins of the Marias Watershed. The sub-basins crossed are: Upper Missouri-Dearborn Rivers, Sun River, Teton River, Marias River, Two Medicine River, Willow Creek, and Cut Bank Creek sub-basins in the Marias Watershed and the Upper Milk River sub-basin in the Milk Watershed. The only water body identified by the FWP as a blue ribbon or red ribbon river in the Project area is the Missouri River. The river miles at which all three alternatives cross the Marias and Teton rivers are considered Habitat Class 3 and Sport Class 4 fisheries.

Several intermittent gulches, coulees, creeks, and rivers cross the Project area. The majority of the water bodies act as tributaries to three major rivers within the Project area: the Marias River, the Teton River, and the Missouri River. Both the Marias and Teton rivers drain into the Missouri River.

The gulches and coulees within the Project area are typically dry during the summer and do not support fisheries. Lakes are predominately man-made stock ponds, reservoirs, or prairie potholes. Water bodies and lakes that hold water year-round are generally capable of supporting both warm-water and cold-water fish species. A list of fish species known to occur within the Project area is presented in **Table 3.9-1.**

TABLE 3.9-1
FISH SPECIES KNOWN TO OCCUR WITHIN THE PROJECT AREA

Game Fish		**Rough Fish/Non-Game Fish**		**Forage Fish**	
Common Name	*Scientific Name*	*Common Name*	*Scientific Name*	*Common Name*	*Scientific Name*
Brown Trout	*Salmo trutta*	Common Carp	*Cyprinus carpio*	Emerald Shiner	*Notropis atherinoides*
Brook Trout	*Salvelinus fontinalis*	Bigmouth Buffalo	*Ictiobus cyprinellus*	Fathead Minnow	*Pimephales promelas*
Rainbow Trout	*Oncorhynchus mykiss*	Freshwater Drum	*Aplodinotus grunniens*	Flathead Chub	*Platygobio gracilis*
Burbot	*Lota lota*	River Carpsucker	*Carpiodes carpio*	Lake Chub	*Couesius plumbeus*
Channel Catfish	*Ictalurus punctatus*	Shorthead Redhorse	*Moxostoma macrolepidotum*	Longnose Dace	*Rhinichthys cataractae*
Northern Pike	*Esox lucius*	Smallmouth Buffalo	*Ictiobus bubalus*	Longnose Sucker	*Catostomus catostomus*
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	Golden Trout	*Oncorhynchus mykiss aguabonita*	Mottled Sculpin	*Cottus bairdi*
Walleye	*Sander vitreus*	Paddlefish S1, S2	*Polyodon spathula*	Mountain Sucker	*Catostomus platyrhynchus*
Yellow Perch	*Perca flavescens*	--	--	--	--
Smallmouth Bass	*Micropterus dolomieu*	--	--	White Sucker	*Catostomus commersoni*
Mountain Whitefish	*Prosopium williamsoni*	--	--	Goldeye	*Hiodon alosoides*
Sauger S2	*Sander canadensis*	--	--	Plains Minnow	*Hybognathus placitus*
Sauger X Walleye Hybrid	--	--	--	Blue Sucker S2, S3	*Cycleptus elongatus*
--	--	--	--	Spottail Shiner	*Notropis hudsonius*
--	--	--	--	Western Silvery Minnow	*Hybognathus argyritis*
--	--	--	--	Sturgeon Chub S2	*Macrhybopsis gelida*
--	--	--	--	Stonecat	*Noturus flavus*
--	--	--	--	Cisco	*Coregonus artedi*

Notes:
Source: MATL 2006b and Montana Fisheries Information System Database (2005).
-- = not applicable
S1: Critically imperiled because of extreme rarity and/or other factors making it highly vulnerable to extinction.
S2: Imperiled because of rarity and/or other factors making it vulnerable to extinction.
S3: Vulnerable because of rarity, or found in restricted range even though it may be abundant at some of its locations.

3.9.3 Environmental Impacts

3.9.3.1 Alternative 1 - No Action

Under the No Action alternative, the proposed Project would not be implemented. There would be no construction activities or associated activities related to a new transmission line and existing electrical transmission service would be maintained and operated at its current level. This would result in no additional impacts to fish or their population within the Project area.

3.9.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Since all action alternatives would entail the proposed transmission line crossing fish-bearing water bodies, and impacts on the water bodies would not vary substantially between alternatives, impacts to fish and their habitat for all action alternatives are addressed within this section.

Potential impacts on the fish-bearing water bodies center around several disturbance related issues, such as: an increase in sediment transport due to increased erosion from disturbed and newly exposed areas; degradation of water quality as a result of contaminants (that is, herbicides or petroleum products); increased temperatures within water bodies as a result of removed riparian and streamside vegetation; or direct impacts or disturbance to fish and their habitats. None of the alternative alignments closely parallel streams or lakes where fish are present. Most crossings of stream habitats are short.

Impacts related to increased erosion and sediment transport would be mitigated and reduced through the implementation of best management practices and environmental protection measures. An erosion control plan would be developed and implemented during construction. Erosion control measures, such as water bars, drainage contours, straw bales, and filter cloths would reduce erosion within disturbed areas and prevent sediment transport to water bodies. In addition, disturbed areas would be contoured and seeded after completion of construction activities, which would reduce erosion and sediment transport. Due to the implementation of the environmental protection measures, increased sediment within water bodies as a result of the action alternatives would likely not occur, and fish and their habitat would not be impacted.

Implementation of a spill prevention plan and environmental protection measures would ensure that water quality is protected from petroleum products and herbicides, and impacts on fish or their habitat would not likely occur.

Impacts on fish habitat as a result of the removal of streamside vegetation and increased water temperatures would not be expected to occur as a result of the implementation of the action alternatives. Structures would not be sited within fish-bearing water bodies and there would be little or no removal of streamside vegetation as a result of construction or related activities.

The structures for alternatives 2, 3, and 4 would not be sited within any water bodies and construction activities would not occur within water bodies that support fish populations. Implementation of the action alternatives would not impact any fish populations or species distribution.

3.10 Threatened, Endangered, and Candidate for Listing Species

3.10.1 Analysis Methods

Analysis Areas

This section addresses the current occurrence, distribution of, and potential impacts to species that are listed as threatened and endangered species under the Endangered Species Act (ESA), species that are candidates for listing, and those that have been proposed for listing. In addition, species with limited members or distribution as indicated by the NHP and the FWP also are discussed in this section. Only species in the Project area are discussed. Analysis areas for vegetation, wildlife, and fish are the same as described in Sections 3.7.1, 3.8.1, and 3.9.1.

Information Sources

Vegetation information sources are the same as described in Section 3.7.1. Wildlife and fish information sources are the same as described in Sections 3.8.1 and 3.9.1.

3.10.2 Affected Environment

3.10.2.1 Vegetation

Species of concern in Montana are those species that are at risk or potentially at risk due to a combination of rarity, restricted distribution, habitat loss, or other limiting factors (MATL 2006b). Within the Project area a variety of habitats could support species of concern. Five plant species of concern have been reported to occur within or adjacent to the Project area (**Table 3.10-1).** Of these species, two (both non-vascular) are historic records. The three vascular species documented in Glacier and Cascade counties are found in similar habitats: wet soils or shallow water around ponds and meadows along streams.

TABLE 3.10-1
PLANT SPECIES OF CONCERN REPORTED TO OCCUR WITHIN OR ADJACENT TO THE PROJECT AREA

Common Name	Scientific Name	State Rank	County	Habitat
Vascular Plants				
Many-headed Sedge	*Carex sychnocephala*	S1[a]	Glacier; Cascade	Found in moist soil of meadows along streams and ponds in the valleys and on the plains.
Long Sheath Waterweed	*Elodea longivaginata*	S1	Glacier	Found in shallow water of ponds and lakes on the plains.
Chaffweed	*Centunculus minimus*	S2[b]	Cascade	Found in vernally wet, sparsely vegetated soil around ponds and along rivers and streams in the valleys and on the plains.
Non-vascular Plants				
Entosthodon moss	*Entosthodon rubiginosus*	SH[c]	Cascade	This species is restricted to seasonally damp and alkaline, usually silt or clay-rich soil at the edges of ponds, lakes, and sloughs, and on seepage slopes in relatively dry environments.
American funaria moss	*Funaria americana*	SH	Cascade	Little information is available, however, it is thought that this species prefers limestone caves and cliffs.

Notes:

Source: MATL 2006b

[a] S1: Critically imperiled because of extreme rarity and/or other factors making it highly vulnerable to extinction.

[b] S2: Imperiled because of rarity and/or other factors making it vulnerable to extinction.

[c] SH: Historical, known only from records over 50 year ago; may be rediscovered.

3.10.2.2 Wildlife

Special status animal species reported to occur within or adjacent to the Project area by the NHP are listed in **Table 3.10-2.**

TABLE 3.10-2
SPECIAL STATUS WILDLIFE SPECIES REPORTED TO OCCUR WITHIN OR ADJACENT TO THE PROJECT AREA BY NHP

Common Name	Scientific Name	Status[a]		
		FWS	BLM	State
Burrowing Owl	*Athene cunicularia*	--	Sensitive	S2B
Ferruginous Hawk	*Buteo regalis*	--	Sensitive	S2B
Baird's Sparrow	*Ammodramus bairdii*	--	Sensitive	S2B
Black-necked Stilt	*Himantopus mexicanus*	--	--	S3 S4B
Black-crowned Night-heron	*Nycticorax nycticorax*	--	--	S3B
Peregrine Falcon	*Falco peregrinus*	--	Sensitive	S2B
Common Tern	*Sterna hirundo*	--	--	S3B
White-faced Ibis	*Plegadis chihi*	--	Sensitive	S1B
Franklin's Gull	*Larus pipixcan*	--	Sensitive	S3B
Black-tailed Prairie Dog	*Cynomys ludovicianus*	C	Sensitive	S3
Long-billed Curlew	*Numenius americanus*	--	Sensitive	S2B
Bald Eagle	*Haliaeetus leucocephalus*	T	--	S3B, S3N

Notes:

Source: MATL 2006b.

[a] FWS: PS = Partial status – status in only a portion of the species' range; LE = listed endangered; C = candidate; T =threatened; - - = not listed

BLM: Sensitive = either known to be imperiled and suspected to occur on BLM lands, suspected to be imperiled and documented on BLM lands, or needing further study for other reasons; -- = not listed

State:

B = a state rank modifier indicating breeding status for a migratory species;

N = non-breeding.

S1 = critically imperiled because of extreme rarity, or because of some factor of its biology making it especially vulnerable to extirpation;

S2 = Imperiled because of rarity, or because of other factors demonstrably making it very vulnerable to extinction throughout its range;

S3 = vulnerable because of rarity, or found in restricted range even though it may be abundant at some of its locations;

S4 = apparently secure, though it may be quite rare in parts of its range, especially at the periphery;

Ferruginous Hawk

A breeding population of approximately 20 pairs of ferruginous hawks was located in 1994 in the Kevin Rim and Buckley Coulee area in the northeastern and north-central portions of the Project area. NHP and FWP biologists indicate this species continues to breed along Kevin Rim (Olson 2005a). This area is a mix of privately owned land and state trust land in Toole County. Kevin Rim is a sandstone escarpment that runs approximately 8 miles, generally north-south, and faces east. The cliffs and adjacent badlands, grasslands, and draws host a very high density of raptor nests, primarily ferruginous hawks and prairie falcon. Section 3.10 discusses additional raptors that nest in the Kevin Rim area. Two biologists walked along approximately 3 miles of Kevin Rim in early May 2005 surveying for raptor nests. No nests and no raptors were observed at that time (MATL 2006b).

Ferruginous hawks also occur in and around Benton Lake NWR in Cascade, Chouteau, and Teton counties. The area is a mix of federally managed land (Benton Lake NWR), privately owned land, and state trust land. A breeding population of at least two pairs has been recorded within the Refuge. The full extent of occupied breeding habitat is unknown. The habitat of ferruginous hawks in Montana has been studied extensively and described as mixed-grass prairie, shrub-grasslands, grasslands, grass-sagebrush complex, and sagebrush steppe (NHP 2004).

Peregrine Falcon

An historical peregrine eyrie is known to occur on private land near the confluence of Cut Bank Creek and Two Medicine River where the Marias River forms in Glacier County. Eyries have a high potential for re-occupancy. It is unknown when peregrine falcons last occupied this eyrie. Peregrine falcons arrive in northern breeding areas in late April-early May and departure begins in late August-early September. Nests typically are situated on ledges of vertical cliffs, often with a sheltering overhang. Ideal locations include undisturbed areas with a wide view, near water, and close to plentiful prey. Substitute man-made sites can include tall buildings, bridges, rock quarries, and raised platforms (NHP 2004).

Black-tailed Prairie Dog

A black-tailed prairie dog town is located southeast of Shelby in Toole County north of the Marias River. This particular population is at the western extent of this species' known distribution (Olson 2005a). Prairie dog colonies are found on flat, open grasslands and shrub/grasslands with low, relatively sparse vegetation. The most frequently occupied habitat in Montana is dominated by western wheatgrass, blue grama, and big sagebrush. Colonies are associated with silty clay loams, sandy clay loams, and loams. Fine to medium textured soils are preferred, presumably because burrows and other structures tend to retain their shape and strength better than in coarse, loose soils. In Montana, colonies tend to be associated with areas heavily used by cattle, such as near water tanks and long-term supplemental feeding sites (NHP 2004).

Baird's Sparrow

Baird's sparrow nests and individual birds have been reported in Teton County on private land. The most recent data available are from the early 1990s. This species is more common east of the Continental Divide in Montana. The majority of observations of the species in the state occur at the earliest in May and the latest in July (NHP 2004). Baird's sparrows prefer to nest in native prairie, but structure may be more important than plant species composition. Nesting may take place in cultivated grasses (nesting has been observed in crested wheat, while smooth brome is avoided). This sparrow has also been found to use drier areas during unusually wet years, and wet areas during unusually dry years. Because a relatively complex structure is so important for nesting, areas with little to no grazing activity are required (NHP 2004).

Burrowing Owl

Burrowing owl nesting sites are known to occur on Benton Lake NWR in Cascade and Chouteau counties and also in Pondera County. Fledglings have been observed on at least two nest sites on the refuge. Burrowing owls are migratory in the northern portion of their range, which includes Montana. The extreme dates of observation for burrowing owls in Montana are, at the earliest, March and, the latest, October (NHP 2005). The majority of the spring reports for this species occur, however, in April with most fall observations in September (NHP 2004).

Burrowing owls are found in open grasslands, where abandoned burrows dug by mammals such as ground squirrels, prairie dogs and badgers are available. Black-tailed prairie dog and Richardson's ground squirrel (*Spermophilus richardsonii*) colonies provide the primary and secondary habitat for burrowing owls in the state. The burrows may be enlarged or modified, making them more suitable. Burrowing owls spend much time on the ground or on low perches such as fence posts or dirt mounds (NHP 2004).

Burrowing owl nesting site surveys were conducted in July 2005 to help assess utilization of the Project area by the species. With the guidance of a FWP biologist (Olson 2005a) surveys were focused north of the Marias River, north of Highway 2, and along the Kevin Rim. Point-count surveys were used to survey for burrowing owls in July 2005 (Conway and Simon 2003). Point-count survey routes were selected based on habitat and anecdotal observation information by landowners and the FWP biologist. At each survey point, the observer pulled the vehicle off the road, parked on the shoulder, exited the vehicle, and performed a 6-minute point-count survey listening for burrowing owl calls and scanning the surrounding landscape for owls using binoculars. While biologists did not observe any burrowing owls during field investigations, FWP biologists (Olson 2005b) and landowners have reported seeing this species within 1 mile of the proposed routes, north of Marias River.

Black-necked Stilt

Approximately 25 black-necked stilt nests were found in 1988 on Benton Lake NWR in Cascade, Chouteau, and Teton counties. This species continues to migrate to and nest on the refuge (Johnson 2005). Extreme migration dates in Montana are April, reported at Benton Lake NWR, and September, reported at Helena Valley Regulating Reservoir. In Montana, black-necked stilts nest in medium to large wetland complexes of open marshes and meadows, often in alkali areas.

Black-crowned Night-Heron

The first confirmed nesting of this species was in 1979, although records indicate presence of the birds as early as 1967 in the Benton Lake NWR area. The earliest records for Montana indicate arrival in April, with sightings throughout the summer months and extending into September, when most of the individuals begin their southerly movement. In 2000, one individual was found in the Chester area and stayed until October. Although highly adaptable to a variety of habitats, the black-crowned night-heron is likely to use shallow bulrush (*Scirpus* spp.) or cattail (*Typha* spp.) marshes, most often within a grassland landscape. In addition, they will also nest in cottonwoods, willows, or other wetland vegetation that allows them to nest over water or on islands that may afford them protection from mammalian predators. Most colonies are located in large wetland complexes, typically with a one-to-one ratio of open water and emergent vegetation (NHP 2004).

Common Tern

Approximately 75 common tern nests were found on Benton Lake NWR in 1988 and this species continues to nest on the refuge (Johnson 2005). The earliest migration date for common tern in Montana is in April, but the most concentrated arrival of birds occurs in May. Breeding has been recorded in May, June, and July, with fall departure beginning in late August and continuing into September. Nesting in Montana generally occurs on sparsely vegetated islands in large bodies of water. Nest substrate at these locations includes sandy, pebbly, or stony substrate, surrounded by matted or scattered vegetation (NHP 2004).

White-faced Ibis

Approximately 15 white-faced ibis nests were found in 1988 on Benton Lake NWR. The number and location of this species' nests on the refuge vary greatly from year to year. It is reported that the white-faced ibis often nests with the black-crowned night heron. White-faced ibises usually leave their wintering grounds in late March to early April. The earliest white-faced ibis observation in Montana was at Lee Metcalf NWR in March, but the most concentrated arrival in Montana occurs in May. In Montana, most begin their southern movement in August, and by September they are usually gone from the state (NHP 2004).

The white-faced ibis breeding habitat is typically freshwater wetlands, including ponds, swamps and marshes with pockets of emergent vegetation. They also use flooded hay meadows and agricultural fields as feeding locations. In Montana, white-faced ibises usually use old stems in cattails, hardstem bulrush, or alkali bulrush over shallow water as their nesting habitat (DuBois 1989). Water conditions usually determine whether nesting occurs in a particular area. Therefore, white-faced ibis nesting sites can often move around from year to year. However, it is a fairly adaptable species and the primary breeding requirement is colony and roosting site isolation (NHP 2004).

Franklin's Gull

In 1994, approximately 13,000 Franklin's gull nests were estimated to have occurred on Benton Lake NWR. The Franklin's gull generally returns to the state in mid-April and is gone by early to mid-October. Preferring large, relatively permanent prairie marsh complexes, the Franklin's gull builds its nests over water on a supporting structure of emergent vegetation. Nesting over water differs from the nesting habits of Montana's other, generally ground nesting, gulls. Franklin's gulls prefer to nest at sites with intermediate vegetation density, interspersed with open water of various sizes. One key feature of selected nesting sites is that the water levels remain high enough throughout the nesting period, or at least until the young can fledge, in order to provide protection from predators. During migration, the Franklin's gull can be found feeding on dry land, especially in cultivated fields prior to planting (NHP 2004).

Long-Billed Curlew

The long-billed curlew is ranked as S2B by the state and thus is considered at risk because of very limited and/or declining numbers, range, and/or habitat. The NHP did not have any element occurrence records for this species within the Project area; however, long-billed curlews were observed within the Project area. The long-billed curlew is a migratory summer resident that breeds and nests in Montana. The species inhabits shortgrass prairie communities, with grassland structure being more important than species composition, and appears to require large blocks of grasslands with diverse foraging habitats. The long-billed curlew nests in well-drained native grasslands, sagebrush, and agricultural lands with a gently rolling topography. The species migrates from coastal habitats in California, Texas, and Mexico, to Montana where it is typically present between May and August.

Bald Eagle

The cottonwood stands along the Marias and Teton rivers may be used by bald eagles during the winter; however, they are not known to nest in the Project area (Olson 2005b). The majority of birds nesting in Montana are found in the western third of the state, although breeding pairs may be found along many of the major rivers and lakes in the central portion of the state and along the Yellowstone and Missouri Rivers to the eastern prairie lands (NHP 2004). East of the Continental Divide, the presence of bald eagles may be somewhat more seasonally dependent than in the western part of the state. Migrants from northern climates travel through Montana to reach wintering grounds further south.

3.10.2.3 Fish

Four fish species identified within the Project area are listed by the NHP as threatened, endangered, or of special concern under the Montana Endangered Species Act (**Table 3.9-1**). The NHP species of concern occurrence report did not include any fish species of concern. However, a search of the Montana Fisheries Information System indicated that three special status fish species potentially occur in the Teton River within the Project area. These three species are: sauger, blue sucker, and sturgeon chub.

The sauger is considered at risk by the State because of very limited and/or declining numbers, range, and/or habitat. The current distribution of the sauger in Montana includes the main stem of the Missouri River and portions of several tributaries, including the Teton River near where the transmission line would span. The sauger is physiologically adapted for turbid environments, and the species typically inhabits large turbid rivers and shallow lakes. Saugers spawn in large tributaries, and juveniles rear in off-channel habitats during spring and summer before shifting to main channel habitats in autumn.

The blue sucker is considered at risk/potentially at risk by the State. Eastern Montana is the home of the blue sucker, and it appears to inhabit the larger streams, primarily the Missouri and Yellowstone rivers. However, blue suckers make long spawning movements from the lower Missouri River to upstream areas and tributary streams followed by dispersal downstream. Blue suckers prefer waters with low turbidity and swift current (NHP 2004). The Montana Fisheries Information System indicates that the blue sucker can be found in the Teton River within the Project area; however, this would be the western extent of this species’ distribution within Montana.

The State considers the sturgeon chub at risk. The sturgeon chub is one of several native minnows found east of the continental divide. Sturgeon chubs are rarely seen or collected, so little is known about them. Their food habits are unknown, but the ventral mouth and short intestine indicate they feed on bottom-dwelling insects. Sturgeon chubs are found in turbid water with moderate to strong current over bottoms ranging from rocks and gravel to coarse sand (NHP 2004).

3.10.3 Environmental Impacts

3.10.3.1 Alternative 1 – No Action

Under the No Action alternative, the proposed Project would not be implemented. There would be no construction activities or associated activities related to a new transmission line and existing electrical transmission service would be maintained and operated at its current level. This would result in no impacts to special status plant species, special status wildlife species, or special status fish or their populations within the Project area.

3.10.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Vegetation

Potential impacts to special status plant species for each alternative transmission line alignment were assessed through an evaluation of existing conditions and potential Project-related effects. These effects could include temporary disturbance, such as trampling, during construction and maintenance activities, habitat loss and fragmentation associated with structure footprints and access roads, the creation of new public access into undisturbed habitats, and possible noxious weed competition resulting from seed introduction from construction and maintenance activities. See Section 3.7.3 for further discussion of the proposed transmission line effects on native plants. Three state sensitive wetland species occur in or adjacent to the Project area; however, no federally listed species were located in the area. The state sensitive species are: many-headed sedge, long sheath waterweed, and chaffweed (**Table 3.10-1**). Historic occurrences of the state sensitive non-vascular species entosthodon mossand American funaria moss were recorded south of the Missouri River, outside of the study area.

The effects on special status vegetation species associated with construction, operation, and maintenance of the proposed transmission line would not differ from those discussed in Section 3.7.3. Furthermore, all special status vegetation species known occurrences are located outside of the analysis area and are therefore not likely to be affected by the alternative transmission line alignments.

Of the action alternatives, Alternative 3 has the least likelihood of affecting species of concern because it crosses less riparian habitat than Alternatives 2 and 4 (**Table 3.7-4**).

Wildlife

Potential impacts to special status wildlife species for each alternative transmission line alignment were assessed through an evaluation of existing conditions and potential project-related effects. These effects could include temporary disturbance during construction and maintenance activities, habitat loss, and fragmentation effects associated with clearing and grading of structure sites and access roads, and the creation of new public access into undisturbed habitats. For a more detailed discussion of general impacts of the proposed transmission line on wildlife, see Section 3.8.3. Sensitive or important wildlife habitats for species of concern within the project area include: intact native prairie grasslands that provide habitat for sharp-tailed grouse, long-billed curlew, and other grassland bird species and mature riparian cottonwood stands that represent a unique habitat type and potential bald eagle winter habitat. Only Alternative 3 would cross cottonwood stands over the Marias and Teton River.

The alternative alignments traverse the known habitat range of five species of concern and one federally threatened species. **Table 3.10-3** lists the linear miles of special status species' habitat range along each of the three action alternatives.

TABLE 3.10-3
LINEAR MILES OF SPECIAL STATUS SPECIES' HABITAT RANGE BY ALTERNATIVE

Common Name	State Rank	Alternative		
		2	3	4
Black-crowned night-heron	S3B	11.2	9.1	2.6
Black-necked stilt	S3, S4B	11.2	9.1	2.6
Burrowing owl	S2B	4.2	3.9	0
Ferruginous hawk	S2B	6.5	0	7.0
Peregrine falcon	S2B	2.5	2.2	3.0
Total for All species (Minus the overlap)	--	19.9	11.3	11.7

Notes:

Source: NHP. 2005. GIS Analyses of Element Occurrence Data. Montana Natural Heritage Program, Helena, Montana. Available at: **http://nhp.nris.state.mt.us/mbd**,.

State: S2 = Imperiled because of rarity, or because of other factors demonstrably making it very vulnerable to extinction throughout its range; B = a state rank modifier indicating breeding status for a migratory species; S3 = vulnerable because of rarity, or found in restricted range even though it may be abundant at some of its locations; S4 = apparently secure, though it may be quite rare in parts of its range, especially at the periphery.
-- = not applicable

Bald Eagles (Federally Threatened)

Bald eagles would not be affected by the construction activities related to the transmission line, as there is no known breeding habitat within the transmission line alignments. In addition, wintering bald eagles that may use the cottonwood stands along the Marias and Teton rivers would not be disturbed because construction activities would occur during the spring and summer months.

The operation of the proposed transmission line could potentially impact bald eagles that may utilize the project area. As with all birds and raptors, there is the potential for transmission line related collisions and electrocutions. Raptor species, such as eagles, are less likely to collide with power lines, perhaps due to their excellent eyesight and tendency to not fly at dusk or in low visibility weather conditions (Olendorff et al. 1981). Impacts would be avoided as action alternatives would implement environmental protection measures that would reduce the potential for avian collisions. Areas with a higher likelihood for avian collisions, such as known flyways, were avoided. In addition, MATL would apply *Suggested Practices for Raptor Protection on Power Lines*, developed by the EEI and APLIC (1996), as appropriate, during design and construction of overhead structures and substation additions. Avian collisions would be reduced as approved line marking devices would be installed every 50 feet on overhead ground wires within all stream, river, and wetland crossings, such as crossings of the Marias River, the Dry Fork Marias River, Teton River, and the area east of Benton Lake NWR and within a ¼-mile buffer around these features. These marking devices would also be placed on any additional important flyway or migration routes that may be identified during pre-construction or construction activities. Monitoring of potential problem areas after construction would ensure that line markers are functioning properly. For more discussion of avian collisions and transmission lines, see Wildlife Section 3.8.

Electrocution of eagles was an issue of concern prior to the development of “avian-safe” structures. MATL transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution. MATL’s line would incorporate avian-safe structures that provide adequate clearance to accommodate a large bird between energized and/or grounded parts. These structures typically have 60 inches of horizontal separation, which can accommodate the wrist-to-wrist span of an eagle. In addition, vertical separation of at least 48 inches can accommodate the height of an eagle from head to feet (APLIC and FWS 2005).

Burrowing Owl (State Sensitive)

The transmission line alignments would pass through burrowing owl habitat along the east side of Benton Lake NWR. While biologists did not observe any burrowing owls during field investigations, FWP biologists (Olson 2005b) and landowners have reported seeing this species within 1 mile of the action alternative alignments, north of the Marias River. The installation of support structures may disturb undetected burrows and displace burrowing owls. However, the amount of habitat loss would be relatively minor and displaced owls would have adjacent burrow habitat to occupy in the event of disruption of burrows. Operation of the proposed transmission line could increase owl collisions. This would be expected to be rare as owls have excellent vision and MATL would be using line-marking devices within designated areas. For more discussion of avian collisions and electrocutions from transmission lines, see Wildlife Section 3.8.

Black-necked Stilt and Black-crowned Night-heron (State Sensitive)
The transmission line alignments pass through the eastern edge of potential nesting grounds for the black-necked stilt and black-crowned night heron just outside the eastern boundary of Benton Lake NWR. This area is a potential migration corridor on the east side of Benton Lake NWR. Nesting stilts and herons may be disturbed and displaced during nesting season as a result of construction activities. This may interfere with the nest success of birds within or adjacent to the construction areas; however, construction activities would be temporary and the opportunity for re-nesting would likely occur. Permanent habitat loss would be limited to the footprint of the support structures and access roads. This habitat loss would be a relatively minor amount with respect to the available habitat within the area.

Ferruginous Hawk (State Sensitive)
Ferruginous hawk habitat is known to occur within and adjacent to the Project area. Impacts to ferruginous hawks would not vary from impacts to other raptors. A discussion of impacts to raptor is in Wildlife Section 3.8.

Long-billed Curlew (State Sensitive)
Long-billed curlews were observed in wheat-stubble fields and CRP land during field investigations throughout the summer 2005 (MATL 2006b). Long-billed curlews would experience temporary disturbance and displacement during installation; however, construction activities would be temporary and the opportunity for re-nesting would likely occur. In addition, there would be habitat loss as a result of support structures and access roads; however, this would be relatively minor and would not impact populations within the area. See Wildlife Section 3.8 for further discussion of the proposed transmission line impacts on birds.

Peregrine Falcon (State Sensitive)
The transmission line alignments cross the location of a historic peregrine falcon eyrie along the Marias River. In May, July, and August 2005 biologists surveyed the confluence of Cut Bank Creek and Two Medicine River looking for the eyrie and signs of peregrine falcons; neither eyrie nor peregrine falcons were observed (MATL 2006b). It is unknown when peregrine falcons last occupied or were sighted around this eyrie (Olson 2005b). The construction activities associated with the proposed transmission line could potentially disturb the peregrine falcon eyrie, if occupied. Disturbances

would be temporary and would not directly disturb any occupied nest sites. For a discussion of collision and electrocution impacts on raptors, see Wildlife Section 3.8.

Fish

A search of the Montana Fisheries Information System indicated that three special status (State Sensitive) fish species potentially occur in the Teton River within the Project area. These three species are: sauger, blue sucker, and sturgeon chub. No federally threatened, endangered, or candidate fish species were identified in the Project area.

Effects on special status fish associated with the implementation of the proposed transmission line would not differ from those discussed in Section 3.9.3.

3.11 Air Quality

3.11.1 Analysis Methods

Potential impacts to air quality from installation of the power transmission line were evaluated using criteria pollutant emission rates from sources (for example, equipment engines and dust from construction activities) and air regulations (including emission standards, as applicable) pertinent to the project.

Analysis Area

The analysis area for air resources is the MFSA application Project study area (**Figure 1.1-1**) and the surrounding air shed within a distance of 10 miles. The analysis area is located in north central Montana and exhibits terrain described as rolling hills with elevations ranging from 3,400 feet (Great Falls) to 3,800 feet (Cut Bank) above mean sea level.

Information Sources

Base information for the analysis of air resources was derived from the Montana MFSA application (MATL 2006b). Base information includes data such as the alignments, area impacted by construction activities, equipment type, and duration of construction. Comparative information, such as ambient air quality, atmospheric conditions, and existing air emission sources, were derived from databases maintained by National Oceanic and Atmospheric Administration (NOAA) (2006), EPA (2006a, 2006b), WRCC (2006), and DEQ (2006a). Regulatory standards for air quality (for example, criteria pollutants) were obtained from EPA (2006b) and DEQ (2006a, 2006b).

3.11.2 Affected Environment

Air quality in the analysis area is affected by activities currently conducted within the area. Examples of such activities include fixed facilities such as petroleum refining plants (refineries), crude oil and natural gas compressor stations, petroleum product terminals, coal-fired electrical generating plants, concrete mix plants, asphalt mix plants, and crematoriums. Portable source examples include facilities such as gravel crushers, associated processing equipment, asphalt plants, and farming. Smoke from grass and forest fires from late spring through early fall can degrade air quality depending on the year.

Climate

Climate is influenced by major topographic features, including the plains of northern Montana, and, 40 to 60 miles to the west, by the Rocky Mountains. The continental divide and Rocky Mountains traverse the western half of Montana in roughly a north-south direction. The continental divide exerts a marked influence on local climate. Climate characteristics east of the continental divide are decidedly continental. In general, the analysis area (east of the continental divide) is colder, is characterized by lower precipitation, and is windier than conditions west of the divide.

Plains in the analysis area range in elevation from about 3,400 to 3,800 feet above mean sea level. Summers typically receive 1 to 2 inches of precipitation per month with temperatures ranging from warm to hot. Winters, while usually cold, have few extended cold spells. Between cold waves there are periods of mild but often windier weather called “chinook” weather. Wind speed and direction data for the subject area from NOAA show varying speeds and direction. Based on data observed at Great Falls, the typical wind speed averages 10.5 miles per hour and blows primarily from the southwest. Chinook winds frequently reach speeds of 25 to 50 miles per hour or more and can persist, with little interruption, for several days.

Temperature and Precipitation

Based on long-term precipitation data collected in Great Falls, Montana, the average daily temperature of the study area ranges from 30°F in January to 83°F in July. Average monthly precipitation ranges from 0.6 inch in February to 2.5 inches in May. The largest amount of precipitation occurs during the spring in May and June. Summer precipitation is often associated with thunderstorms. Total annual precipitation from 1961 to 1990 averaged 15.2 inches per year.

Fall and winter are cool to cold with few extended cold spells. Most precipitation during this period is in the form of snow; annual snowfall ranges from 14 to 60 inches with heavier accumulations generally recorded closer to Great Falls.

Air Quality

DEQ and the federal government have established ambient air quality standards for criteria air pollutants including carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter smaller than 10 microns (PM_{10}), ozone, and nitrogen oxides (NO_x). In 1997, the EPA revised the federal primary and secondary particulate matter standards by establishing annual and 24-hour standards for particles 2.5 micrometers in diameter or smaller ($PM_{2.5}$).

Table 3-11.1 lists federal and state air quality standards. National primary standards are levels of air quality necessary, with an adequate margin of safety, to protect public health. National secondary standards are levels of air quality necessary to protect public welfare from known or anticipated adverse effects of a regulated air pollutant.

The attainment status for pollutants within the project area is determined by monitoring levels of criteria pollutants (CO, Pb, SO_2, PM_{10}, ozone, and NO_x) for which National and Montana Ambient Air Quality Standards exist. Air quality in the analysis area is designated as attainment for all criteria pollutants. The attainment designation means that no violations of Montana or national air quality standards have been documented in the area. Great Falls was reclassified in 2002 by the EPA from non-attainment for carbon monoxide to attainment.

TABLE 3.11-1
STATE OF MONTANA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Air Quality Standard Concentration [a]	
		Montana	National
Ozone	1 hour	195 µg/m³ (0.12 ppm)	235 µg/m³ (0.12 ppm)
	8 hours	--	157 µg/m³ (0.08 ppm)
Carbon Monoxide	1 hour	25,560 µg/m³ (23 ppm)[b]	40,000 µg/m³ (35 ppm)
	8 hour	10,000 µg/m³ (9.0 ppm) [b]	10,000 µg/m³ (9.0 ppm)
Nitrogen Oxides	Annual Arithmetic Mean	100 µg/m³ (0.05 ppm)	100 µg/m³ (0.05 ppm)
Sulfur Dioxide	Annual Arithmetic Mean	52 µg/m³ (0.02 ppm)	80 µg/m³ (0.03 ppm)
	24 hours	261 µg/m³ (0.10 ppm)	365 µg/m³ (0.14 ppm)
	3 hours	--	1,300 µg/m³ (0.50 ppm)
	1 hour	1,300 µg/m³ (0.50 ppm)	--
Particulate Matter as PM_{10}	Annual Arithmetic Mean	50 µg/m³	50 µg/m³
	24 hours	150 µg/m³	150 µg/m³
Particulate Matter as $PM_{2.5}$	Annual Arithmetic Mean	15 µg/m³	15 µg/m³
	24 hours	65 µg/m³	65 µg/m³
Lead (Pb)	Quarterly Arithmetic Mean	1.5 µg/m³	1.5 µg/m³

Note: µg/m³ = micrograms per cubic meter; ppm = parts per million; PM_{10} = Particulate Matter smaller than 10 microns; $PM_{2.5}$ = Particulate Matter smaller than 2.5 microns.

Sources: Administrative Rules of Montana (ARM) 17.8 and 40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards

a Primary Standard unless otherwise noted

b Secondary Standard

Air Quality Monitoring Data

Ambient air quality data have been collected in or near the analysis area at monitoring stations in Great Falls and Browning, Montana. Data from monitoring stations in Browning (approximately 35 miles west of the power line alignment) were included to provide a second source (that is, city location) of information. Data collected at the Great Falls sites include criteria pollutants PM_{10}, $PM_{2.5}$, SO_2, and CO. Data collected at the Browning sites include the criteria pollutant PM_{10}. Air quality data for criteria pollutants are presented in **Appendix K.**

PSD Classification

The analysis area and vicinity are designated Class II, as defined by the federal Prevention of Significant Deterioration (PSD) provision of the Clean Air Act. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. Industrial emission sources proposing construction or modifications must demonstrate that the proposed emissions would not cause major deterioration of air quality in all areas. The standards for significant deterioration are more stringent for Class I areas than for Class II.

Federal/State Mandatory Class I areas located within 100 miles of the project area include Scapegoat Wilderness (50 miles west), Bob Marshall Wilderness (50 miles west), Glacier National Park (40 miles west), and Gates of the Mountains Wilderness (50 miles southwest).

Existing Sources

There are multiple air emission sources in the vicinity of the project area. Some of the permitted fixed facilities include petroleum refining plants (refineries), crude oil and natural gas compressor stations, petroleum product terminals, concrete mix plants, asphalt mix plants, crematoriums, and other facilities. Permitted portable facilities include gravel crushers and associated processing equipment, and asphalt plants. These facilities operate under specific permit limits for criteria pollutants such as PM_{10}, $PM_{2.5}$, SO_2, CO, and Pb. Other potential emission sources (for example, fugitive dust and smoke sources) include farming, field and forest burning, and dust from gravel roads.

Particulate Emissions

Potential sources of particulate (for example, PM_{10}, $PM_{2.5}$) emissions for the action alternatives could come from equipment used during the construction of the power line and from equipment used to conduct maintenance and make repairs to the transmission line during the life of the project. Possible emissions during construction include fugitive dust from vehicles and equipment traveling on dirt roads and from engine exhaust.

Gaseous Emissions

Potential sources of gaseous (for example, NO_2, SO_2, and CO) emissions for the proposed Project could come from equipment used during the construction of the power line and from equipment used to conduct maintenance and make repairs to the transmission line during the life of the project. Possible emissions could be associated with engine exhaust from equipment traveling to the site and along access roads.

Air Quality Permitting

Industrial air quality permitting is part of the Montana State Implementation Plan process. DEQ uses air quality permit conditions to help ensure compliance with applicable Montana and National Ambient Air Quality Standards and PSD increments. Work conducted under the proposed Project would be subject to Administrative Rules of Montana (ARM) Title 17, Chapter 8 (Air Quality). Due to the nature of the project (that is, mobile equipment and short duration of construction), no specific permit requirements apply to gaseous emissions. However, construction would be required to comply with fugitive dust provisions under subchapter 3, which require precautions to control airborne particulate emissions.

3.11.3 Environmental Impacts

Under all alternatives, no air quality permit or prevention of significant deterioration analysis would be needed.

3.11.3.1 Alternative 1 - No Action

Emissions

Under the No Action alternative, the power line would not be constructed and emissions and air quality in the area would remain at current levels.

3.11.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Alternatives 2, 3, and 4 would result in an increase in activities that could adversely affect air quality during construction (short term), and during operation and maintenance of the transmission line (long term). For example, construction equipment (earthmoving equipment, cranes, or other equipment) and support vehicles (crew transportation, fueling, or other vehicles) would be used during the construction phase, and lighter equipment (for example, four-wheel-drive pickups) would be used during the operation and maintenance period. The construction phase is anticipated to last approximately 8 months. Operations and maintenance activities would last the life of the project, but impacts would be intermittent (for example, monthly and quarterly) and relatively minor compared to impacts during construction.

Emissions

Emissions from construction equipment and support vehicles would be transient and short term. The duration of the adverse impact would be a function of whether the source activity is associated with construction, or with operations and maintenance activities. The majority of the adverse impact would occur during the project construction phase when there is a relatively larger amount of equipment movement and vehicular traffic. Air quality impacts would include fugitive dust and gaseous emissions from engine operation. Fugitive dust would be controlled through dust control measures such as water sprays, limiting the speed of construction equipment, and reseeding the disturbed areas at the end of the construction period. Gaseous emissions would be limited through construction management and scheduling.

Differences in the rate of emissions between alternatives would be a function of the amount of time project vehicles and equipment are used in the transmission line right of way. The amount of time equipment is used depends on several factors including, but not limited to, length of the transmission line for each alternative, overall topography and the presence of difficult or steep terrain, and the number of stream crossings. An alternative characterized by a longer alignment or difficult terrain would result in overall greater emissions.

3.12 Audible Noise

Noise is defined as unwanted sound; it may be intermittent, continuous, steady, impulsive, stationary, or transient. Noise levels are quantified using units of decibels. The A-weighted scale approximates the human ear's response to sounds most effectively. These measurements are reported in A-weighted decibels (dBA).

Audible noise from transmission lines is primarily due to point source corona (crackling and hissing with small amounts of light). It routinely occurs when air is ionized around a gap, burr, irregularity, or some non-insulated component during the conductance of electricity across power lines. Periods of rain, fog, or heavy humidity amplify these corona effects due to the bridging capabilities of electricity and water. Additionally, corona is produced when transmission lines break down over time and their fastener components loosen resulting in an air gap. All corona-based noise sources would be point source locations due to the inconsistencies found along the line.

In addition to audible noise due directly to the transmission line and to other environmental factors, noise can be generated as a result of wind blowing across power lines and power poles when airflow is non-laminar (see Section 3.12.3).

3.12.1 Analysis Methods

Analysis Area

The analysis area for noise is the proposed and alternative transmission line alignments. Noise estimates were made at the edge of the EMF safety zone and 100 feet to either side of the centerline.

Information Sources

The U.S. Department of Housing and Urban Development (HUD) noise level criteria that developments and industrial construction must adapt to are a 65 dBA day/night noise level (L_{dn}) for exterior environments and 45 dBA L_{dn} for interior home environments (HUD 2001).

The DOE BPA conducted research to determine the likelihood of receiving complaints related to transmission line audible noise. These noise values can be related to the level that would be exceeded 50 percent of the time during rain over 1 year (L_{50}) (BPA 1982). The L_{50} values, under foul weather, are calculated at 100 feet from the centerline (BPA 1982).

The following probabilities of receiving complaints are based upon their expected audible noise level:

- High, Numerous Complaints: 60 dBA
- Moderate, Some Complaints: 52 to 60 dBA
- Low, No Complaints: 52 dBA

MATL used the BPA Corona and Field Effects Program (Version 3.0) to determine the decibel levels from the centerline for the H-frame and monopole structures (MATL 2006b).

3.12.2 Affected Environment

With the exception of the immediate Cut Bank area, the proposed project alternatives are located in a rural, predominantly agricultural area. Sources of background noise to rural residents and occasional visitors to the area include wind, agricultural activity, recreation (primarily hunting), and vehicles traveling the numerous county and state roadways and Interstate 15 in proximity to these alternatives. See **Table 3.12-1** for common noise sources and their noise levels.

TABLE 3.12-1
NOISE LEVELS OF COMMON SOURCES

Sound Source	Sound Pressure Level (dBA)
Air raid siren at 50 feet	120
Maximum levels in audience at rock concerts	110
On platform by passing subway train	100
On sidewalk by passing heavy truck or bus	90
On sidewalk by typical highway	80
On sidewalk by passing automobiles with mufflers	70
Typical urban area background/busy office	60
Typical suburban area background	50
Quiet suburban area at night	40
Typical rural area at night	30
Isolated broadcast studio	20
Audiometric (hearing testing) booth	10
Threshold of hearing without hearing damage	0

Source: Cowan 1994
dBA = A-weighted decibels.

General noise level data from the EPA and the National Transit Institute were used to provide a typical sound level range for rural residential and agricultural cropland uses. Typical baseline noise levels in the Project study area likely range from approximately 30 dBA to 48 dBA (EPA 1978).

ARM 17.20.1607(2)(a) states "for electric transmission facilities, the average annual noise levels, as expressed by dBA-L_{dn} would not exceed 50 decibels at the edge of the right of way in residential and subdivided areas." The BPA design criterion for corona-generated audible noise (L_{50}, foul weather) is 50 +/-2 dBA at the edge of the right of way (BPA 1982).

Commercial and industrial activities (linear/point facilities) within the analysis area include communication sites (cell towers, microwave facilities), oil and gas development, surface mines (gravel pits), airstrips (public and private), railroads, pipelines and transmission lines, roadways, and military installations (MATL 2006b) Additionally, most residential areas (sensitive receptors) throughout the analysis area are approximately ¼ mile from the proposed transmission line centerline and alternative alignments.

3.12.3 Environmental Impacts

3.12.3.1 Alternative 1 – No Action

There would be no noise impacts related to selection of the No Action alternative.

3.12.3.2 Alternatives 2, 3 and 4 – Action Alternatives

Noise resulting from these alternatives would come from construction, corona effects, and wind.

Short-Term Adverse Impacts

Transmission line construction would require the short-term use of the following kinds of construction equipment: cranes, augers, compressors, air tampers, generators, haul trucks, bulldozers, excavators, concrete equipment, and other equipment. Construction activities would create both intermittent and continuous noises throughout the project at multiple pole locations along the chosen alignment. Intermittent noises would be created by passing trucks, loading and unloading operations, drilling, and other activities. Continuous noises would be created by generators, air tampers, compressors, and drilling operations.

The typical range of noise for earthmoving equipment at 50 feet is from 72 to 96 dBA. Typical ranges of noise for material handling equipment is from 75 to 88 dBA. Noise values 100 feet from the source are 66 to 90 dBA; noise values ¼ mile away are 44 to 68 dBA. Different makes and models of equipment, motor idling speeds, engine maintenance characteristics, and overall muffler performance would result in different dBA values.

The transmission line support structures would average approximately 500 to 800 feet apart and would be constructed within the alignment (MATL 2006b). Approximately 10 to 12 transmission line structures would be erected per day. Therefore, the areas directly perpendicular to the facility location would be affected approximately half the day during the construction process (VandenBos 2006).

During the construction process, vibration levels from heavy equipment grading, transport, and compacting activities may cause vibrations noticeable to residents within 100 feet. The peak vibration level from pile driving activities would cause the largest perceptible impact within the facility location. Other activities such as large trucks and equipment motoring over potholes and rocks would cause slight noticeable vibrations up to 100 feet.

Long-Term Adverse Impacts

Corona

Table 3.12-2 identifies the audible noise values calculated in MATL's permit application when simulating the 230-kV transmission line for both H-frame structures and monopole structures. Standard transmission line building constituents were used including a rain rate (applicable to audible noise) of 0.14 inch per hour (MATL 2006b). BPA indicated that the rain data typically used in the program are from an average of rainfall throughout the northwest region (Sterns 2006) which has more precipitation per year than the analysis area. Additionally, the rain events are a shorter duration than those of the analysis area, which would limit the audible noise dose received at the boundary from the centerline (100 feet). Based upon historic weather data from the WRCC, the city with the highest rainfall is Great Falls with an average of 14.81 inches per year (WRCC 2006). Actual local conditions for rain are around 0.0017 inch per hour. The BPA modeling formula for transmission noise indicates that more noise is expected with larger amounts of rain. Therefore, the estimated noise calculated by MATL (**Table 3.12-2**) is considerably higher than what would actually be generated.

Table 3.12-2 indicates that for H-frame structures, audible noise levels of 46.23 dBA and 49.56 dBA would be expected at distances of 100 feet, and 52.33 feet (edge of safety zone) from the centerline, respectively. These values would be below the recommended guidelines for corona-generated 50 +/- 2 dBA at the edge of the right of way, developed by BPA, and the 65 dBA exterior noise housing regulations developed by HUD.

TABLE 3.12-2
AUDIBLE NOISE EFFECT

Pole Type	Distance from Centerline (feet)	Audible Noise (dBA) (L_{50})
H-frame Double Pole	100	46.23
	52.33	49.56
Monopole	100	47.13
	54	50.00
	30.18	52.48

Notes:

Estimates calculated using Corona and Field Effects Program (Kingery 1991), and based on conductor ground clearance of 19.72 feet (NESC specification). dBA (L_{50}) = decibels (A-weighted) during foul weather, indicated by L_{50}.

No data are available for noise generated by wind.

Wind

Noise can be generated as a result of wind blowing across power lines and power poles when airflow is non-laminar. Only limited research has been conducted to address wind-caused noise due to transmission line placement in urban and rural settings. For example, a wind velocity of 20 meters per second across a single conventional-style conductor cable resulted in a single-point octave band center frequency of 55 dBA at 100 hertz (Furukawa Review 2002). Data from multiple conductor lines for varying wind velocities are not available.

3.13 Socioeconomics

3.13.1 Analysis Method

Analysis Area

The socioeconomic analysis area defined for the Project includes portions of Cascade, Chouteau, Glacier, Pondera, Teton, and Toole counties. This section provides the demographic, social, and economic profiles of each of these counties. These profiles will serve as a basis from which to estimate potential impacts to the socioeconomic condition of the region should the Project be implemented. This section also includes the baseline conditions for evaluating effects of the Project on minority and low income populations in accordance with the February 11, 1994, Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority and Low Income Populations* (February 11, 1994).

Information Sources

The demographic profiles for each county are based on U.S. Census data collected in 2000, as presented in the MFSA application (MATL 2006b). Population and growth estimates developed in 2005 by the U.S. Census Bureau are also referenced, although these data are not uniformly available across all counties and towns within the analysis area. As a result, these estimates are generally not used for quantitative analysis, but may be used in certain instances to provide a temporal characterization of a specific locality when appropriate. Additional demographic and economic statistics were compiled from various sources including, but not limited to, the Montana Department of Labor and Industry, Montana Department of Commerce, and the USDA.

Estimates of construction labor force and capital construction costs are based on available information from MATL and figures developed during construction of similar projects occurring elsewhere.

Information related to public services, including level of service and capacity, was obtained through documents provided by MATL to DEQ in the spring of 2006.

Methods of Analysis

Direct, indirect, and cumulative impacts to socioeconomic resources were assessed based on reviews of similar projects that have occurred in the state and other relevant energy industry policy documents and through interviews with individuals whose fields of expertise and experience provide insight relevant to this specific project. Such sources are referenced as appropriate. Conclusions regarding the impacts to local services that may occur during construction, operation, and maintenance of the project were developed by evaluating the number of employees and the duration of these activities relative to the availability of services and amenities that may be required.

3.13.2 Affected Environment

The discussion below presents information on demographics, economic activity, and local resources for each county in the analysis area.

3.13.2.1 Demographics

The Project analysis area is characterized by large expanses of open, sparsely populated agricultural land. Over 88 percent of the land within the analysis area is cropland, while the remaining agricultural lands are used for grazing or are under the federal CRP (MATL 2006b). Like much of the upper Great Plains, market forces triggered in part by advances in farming technology, consolidation of large ranch tracts into corporate production, and large tracts removed from production under the CRP have contributed to a decline in the populations of Pondera and Toole counties and general stagnation of growth in Teton County since the 1960s. The Montana Department of Labor and Industry (2005) reports that oil and gas account for only about 11 percent of Toole County's total wages and even less in the other counties in the analysis area. These factors combine to reduce demand for labor and demand for goods and services related to agricultural and energy production. The population of Chouteau County has similarly declined to less than half the number of people today than were there in the early 1900s. However, the 2005 estimated population of Chouteau County is about the same as the reported population in 1990 (U.S. Census Bureau 2005a). Meanwhile, growing tribal population on the Blackfeet Reservation, which makes up the largest population sector in Glacier County, has resulted in a growth rate in that county that has mirrored the state's growth pattern. The state's population grew by almost 13 percent between 1990 and 2000, while the population of Glacier County grew by 9.3 percent during that same time period. Growth levels for both the state and Glacier County have tapered since then, to 3.7 percent and 2.3 percent, respectively. Cascade County's population grew steadily, about 0.6 percent annually, throughout most of the 1900s, but tapered off toward the end of the century and is estimated to have decreased since the 2000 federal census years (U.S. Census Bureau 2000a).

Demographic data for each of the counties within the Project analysis area, as generally described in MATL's MFSA Application (MATL 2006b), are presented below and summarized in **Tables 3.13-1** and **3.13-2**.

TABLE 3.13-1
DEMOGRAPHIC PROFILES OF COUNTIES WITHIN THE PROJECT ANALYSIS AREA

	Cascade County		**Teton County**		**Chouteau County**		**Pondera County**		**Toole County**		**Glacier County**		**Percent in Montana**
	No.	Percent in County	No.	Percent in County	No.	Percent in County	No.	Percent in County	No.	Percent in County	No.	Percent in County	
Total Population	80,357 79,298 (2001)	--	6,445	--	5,970 5,575 (2004)	--	6,424	--	5,267	--	13,247 13,508 (2004)		
Gender													
Male	39,756	49.5	3,174	49.2	2,997	50.2	3,169	49.3	2,716	51.6	6,553	49.5	49.8
Female	40,601	50.5	3,271	50.8	2,973	49.8	3,255	50.7	2,551	48.4	6,694	50.5	50.2
Age													
15 or Younger	17,163	21.4	1,392	21.6	1,384	23.2	1,503	23.4	1,066	20.2	3,757	28.4	20.6
16 – 24	11,100	13.8	758	11.8	724	12.1	810	12.6	638	12.1	2,067	15.6	14.4
25 – 44	22,558	28.1	1,587	24.6	1,437	24.1	1,594	24.8	1,484	28.2	3,560	26.9	27.2
45 – 64	18,288	22.8	1,635	25.4	1,382	23.1	1,473	22.9	1,242	23.6	2,642	19.9	24.4
65+	11,248	14.0	1,073	16.6	1,043	17.5	1,044	16.3	837	15.9	1,221	9.2	13.4
Average Age	37.2	--	39.3	--	38.7	--	38.0	--	38.8	--	32.5		37.4

Notes:
Source: U.S. Census Bureau, 2005a
-- = Not applicable

TABLE 3.13-2
RACE AND ETHNICITY WITHIN COUNTIES IN THE PROJECT ANALYSIS AREA

Race or Ethnicity	Cascade County		Teton County		Chouteau County		Pondera County		Toole County		Glacier County		Percent in Montana
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
White	72,897	90.7	6,207	96.3	5,015	84.0	5,374	83.7	4,945	93.9	4,693	35.4	90.6
Black or African American	900	1.1	12	0.2	5	0.1	6	0.1	8	0.2	11	0.1	0.3
American Indian and Alaskan Native	3,394	4.2	98	1.5	873	14.6	929	14.5	168	3.2	8,186	61.8	6.2
Asian	652	0.8	6	0.1	14	0.2	9	0.1	16	0.3	9	0.1	0.5
Native Hawaiian and other Pacific Islander	67	0.1	0	0	6	0.1	3	0.1	1	0.1	7	0.1	0.1
Some other race	547	0.7	27	0.4	14	0.2	8	0.1	17	0.3	24	0.2	0.6
Two or more races	1,900	2.4	95	1.5	43	0.7	95	1.5	112	2.1	317	2.4	1.7
Hispanic or Latino	1,949	2.4	73	1.1	40	0.7	54	0.8	61	1.2	159	1.2	2.0

Note:
Percentages may not equal 100 because of rounding and potential duplicate counting for “some other race” and “two or more races.”

Cascade County

Cascade County encompasses the southern portion of the Project analysis area and is Montana's third most populous with 79,298 residents (U.S. Census Bureau 2000a). Cascade County covers approximately 2,698 square miles of land, resulting in an average population density of approximately 30 individuals per square mile. County population levels declined by approximately 2.7 percent between 1970 and 2005 based on estimates provided by the Montana Department of Commerce (2005).

The City of Great Falls is the largest population center (56,622 people based on the 2000 federal census) in the county and is also the county seat. Other towns in Cascade County include Belt, Black Eagle, Cascade, Fort Shaw, Monarch, Neihart, Simms, Stockett, Sun River, Ulm, and Vaughn. These towns range in size from approximately 70 people to close to 1,000 in Black Eagle, according to U.S. Census Bureau Data (2000a). Malmstrom Air Force Base is also located in Cascade County east of Great Falls and accounts for approximately 5,400 people in the county (Great Falls Development Authority 2005).

Average family size within Cascade County is 2.97 individuals, and the average household size is 2.41 individuals. Most people are homeowners (64.9 percent), while the remainder rent housing. Less than 8 percent of housing units are unoccupied.

Chouteau County

Chouteau County encompasses 3,973 square miles. Based on the most recent population estimates of 5,463 individuals (Montana Department of Commerce 2005), the population density is approximately 1.4 persons per square mile. The 2005 population estimates, derived from tax records and birth and death statistics, suggest that Chouteau County has potentially lost up to 8.5 percent of its population between 2000 and 2005. This sharp decline balances with a similar increase in population between 1990 and 2000, but overall there has been a relatively steady decline since 1960. Communities within Chouteau County include the county seat of Fort Benton, Big Sandy, Box Elder, Carter, Geraldine, Iliad, Loma, and Shonkin. According to the 2000 federal census, the average family within Chouteau County contains 3.1 individuals and the average household size is 2.6 individuals. Approximately 69 percent of the county's residents are home owners while the remainder rent. The housing vacancy rate is fairly high at 19.8 percent.

Glacier County

After Cascade County, Glacier County is the most populous county within the Project analysis area with an estimated 2005 population of 13,552. Land area of the county is 2,995 square miles, resulting in an average density of 4.5 people per square mile. Unlike the other counties within the analysis area that have experienced a population reduction, Glacier County grew approximately 2.3 percent between 2000 and 2005 (Montana Department of Commerce 2005).

Principal communities in Glacier County include Babb, Browning, Cut Bank, Del Bonita, and Saint Mary. Cut Bank is the county seat and reported an estimated population of 3,155 in 2004 (U.S. Census Bureau 2005a). The Blackfeet Reservation accounts for the majority of the county's land area and the majority of the county's population. U.S. Census data indicate that in 2000, the total on-reservation and off-reservation trust land Blackfeet population was estimated to be about 10,100 and the on-reservation population alone was 8,507 (64.2 percent of the census year 2000 population). If all of these individuals reside in Glacier County, they would account for 76 percent of all people in the county. The Blackfeet tribe also represents a growing population in the county, which is likely the driving force behind Glacier County's growth (about 0.6 percent annually since 1970) (U.S. Census Bureau 2000b).

The average family in Glacier County consists of 3.6 individuals and the average household size is 3 individuals. About 62 percent of the residents are homeowners; the remainder rent. About 18 percent of the county's housing inventory is vacant.

Pondera County

Pondera County encompasses approximately 1,625 square miles and had an estimated population of 6,087 people in 2005 (Montana Department of Commerce 2005), resulting in an average population density of roughly 3.7 people per square mile. The 2005 population estimate indicates that the population of the county has declined by 5.2 percent since 2000. Historic population records indicate an annual decline of 0.2 percent since 1960.

Principal communities within Pondera County include Conrad, Heart Butte, and Valier. Conrad is the county seat.

The average family in Pondera County is comprised of 3.2 individuals and the average household size is approximately 2.6 individuals. Most of the county's residents own their principal residence (70.5 percent), while the remainder are renters.

Teton County

Teton County encompasses an area of 2,272.6 square miles. The total population as of 2000 was 6,445 persons, yielding a population density of approximately 2.8 persons per square mile. County population levels have been generally stagnant since about 1980, and recent population estimates for 2005 (Montana Department of Commerce 2005) indicate a 3.2 percent decline since 2000. Choteau is the county seat and is home to roughly 28 percent of the county's residents. The remainder of the population is distributed throughout unincorporated county lands and small towns and communities within the county, the largest of which is Fairfield with a 2004 estimated population of 641 (U.S. Census Bureau 2005a).

Average family size in Teton County is 3.1 individuals and the average household size is 2.5 individuals. Most people in the county own their home (75.4 percent) while the remainder rent. Approximately 12.8 percent of housing units are unoccupied.

Toole County

The total estimated population of Toole County in 2005 was 5,031 (Montana Department of Commerce 2005 and Montana Department of Labor and Industry 2005). Land area of the county is 1,911 square miles, yielding an average population density of 2.6 individuals per square mile. Communities in Toole County include the county seat of Shelby, which is also the most populous town in the county with approximately 3,304 residents in 2004 (U.S. Census Bureau 2005a) and Kevin, Sunburst, and Sweetgrass.

The average family contains 3.1 individuals, and the average household size is 2.5 individuals. Approximately 71.2 percent are homeowners. About 14.7 percent of the houses in the county are vacant.

3.13.2.2 Economic Activity

Economic activity in the analysis area ranges from heavy reliance on agriculture to growing development in the education, health, and social services sectors. In MATL's March 2006 response to DEQ comments, employment and labor trend data compiled from the U.S. Department of Labor, Bureau of Statistics were presented for each of the counties within the analysis area (MATL 2006b). These data were compiled for the last 5 years, documenting the total labor force available, total employment, total unemployment, and the resulting unemployment rate (**Table 3.13-3**). In general, unemployment rates have been fairly steady over the last 5 years, with three counties (Cascade, Teton, and Toole) seeing a small decline (0.5 percent or more) in total unemployment. Higher unemployment rates in Glacier County are attributable to the disproportionately higher unemployment rate on the Blackfeet Indian Reservation, which in 2005 was reported to be 69 percent of the available tribal workforce (Bureau of Indian Affairs 2005). The unemployment rate for the county as a whole, which is the highest of the analysis area counties, is reported at 8 percent, though this has fluctuated from a high of 8.2 percent to a low of 6.9 percent over the last 5 years. Pondera and Chouteau counties saw a slight increase (less than 1 percent) in unemployment over this time period (MATL 2006b).

TABLE 3.13-3
EMPLOYMENT AND DATA TRENDS BY COUNTY, 2000 – 2005[a]

Year	Labor Force	Employment	Unemployment	Unemployment Rate (%)
Cascade County				
2000	38,287	36,386	1,901	5.0
2001	38,419	36,719	1,700	4.4
2002	38,411	36,776	1,635	4.3
2003	38,558	36,992	1,636	4.2
2004	39,209	37,566	1,643	4.2
2005[b]	40,474	38,697	1,777	4.4
Chouteau County				
2000	2,799	2,698	101	3.6
2001	2,723	2,629	94	3.5
2002	2,474	2,387	87	3.5
2003	2,518	2,437	81	3.2
2004	2,633	2,454	88	3.3
2005 [b]	2,694	2,590	104	3.9
Glacier County				
2000	5,715	5,248	467	8.2
2001	5,775	5,348	427	7.4
2002	5,585	5,199	386	6.9
2003	5,750	5,315	435	7.6
2004	5,942	5,466	476	8.0
2005 [b]	6,105	5,614	491	8.0
Pondera County				
2000	2,976	2,836	140	4.7
2001	2,892	2,771	121	4.2
2002	2,745	2,630	124	4.5
2003	2,771	2,641	130	4.7
2004	2,715	2,568	147	5.4
2005 [b]	2,764	2,612	152	5.5
Teton County				
2000	2,974	2,846	128	4.3
2001	2,926	2,815	111	3.8
2002	2,906	2,796	110	3.8
2003	2,949	2,840	109	3.7
2004	3,001	2,885	116	3.9
2005 [b]	3,047	2,931	116	3.8
Toole County				
2000	2,523	2,422	101	4.0
2001	2,429	2,346	83	3.4
2002	2,348	2,266	82	3.5
2003	2,538	2,453	85	3.3
2004	2,586	2,500	86	3.3
2005[b]	2,661	2,568	93	3.5

Notes:
[a] Reflects 2000 Census-based geography, new model controls, 2000 Census inputs.
[b] Average through Nov. 2005
Source: U.S. Department of Labor, Bureau of Labor Statistics, 2005.

Countywide earnings data by industry sector were available for 2001 through 2004 (**Tables 3.13-4 through 3.13-9**). In general, the data for each county indicated an increase in total wages across most sectors. However, Cascade County experienced a marked decrease (almost 50 percent) in total wages within the natural resources and mining sector (agriculture, forestry, and mining) between 2001 and 2004. The decrease is likely attributable to growth in other, more urban-related sectors such as the information and health, education, and social services sectors. Teton County experienced a substantial decline in wages associated with the manufacturing industry sector (40 percent) over the same time period but saw large increases in retail trade (83 percent) and in the professional, scientific, management, administrative, and waste management industry sector (almost 400 percent). Elsewhere, wages in the natural resources and mining sectors generally held steady or increased. Large increases in wages in this sector were realized in Glacier County between 2002 and 2004 (approximately 91 percent), where oil and gas exploration, as a subsector of the mining industry, increased by 150 percent from 2001 to 2004 (Montana Department of Commerce 2006).

TABLE 3.13-4
INDUSTRY SECTOR EARNINGS TRENDS – CASCADE COUNTY

INDUSTRY	Total 2004 Wages by Sector (in thousands)	Trend between 2001-2004 (percent change)
Agriculture, forestry, fishing and hunting, and mining	2,815	-49.55
Construction	63,118	+21
Manufacturing	32,166	+0.3
Wholesale trade	51,191	+18
Retail trade	103,637	+6.7
Transportation and warehousing, and utilities	34,264	+4.1
Information	23,985	+23.7
Finance, insurance, real estate, and rental and leasing	89,744	+19.4
Professional, scientific, management, administrative, and waste management services	74,368	+17.5
Educational, health and social services	224,140	+16.7
Arts, entertainment, recreation, accommodation and food services	50,432	+16.8
Other services (except public administration)	23,672	+14.5
Public administration	67,345	+21

Notes:
Source - US Department of Labor, Bureau of Labor Statistics 2005.

TABLE 3.13-5
INDUSTRY SECTOR EARNINGS TRENDS – TETON COUNTY

INDUSTRY	Total 2004 Wages by Sector (in thousands)	Trend between 2001-2004 (percent change)
Agriculture, forestry, fishing and hunting, and mining	1,263	+4.12
Construction	980	+68.38
Manufacturing	289	-40.17
Wholesale trade	4,459	+29.28
Retail trade	3,333	+83.23
Transportation and warehousing, and utilities	3,632	+21.55
Information	6,961	+15.38
Finance, insurance, real estate, and rental and leasing	2,698	+39.1
Professional, scientific, management, administrative, and waste management services	1,292	+396
Educational, health and social services	9,927	+22.4
Arts, entertainment, recreation, accommodation and food services	1,209	+3.6
Other services (except public administration)	483	-13.6
Public administration	3,242	+3

Notes:

Source - US Department of Labor, Bureau of Labor Statistics 2005.

TABLE 3.13-6
INDUSTRY SECTOR EARNINGS TRENDS – CHOUTEAU COUNTY

INDUSTRY	Total 2004 Wages by Sector (in thousands)	Trend between 2001-2004 (percent change)
Agriculture, forestry, fishing and hunting, and mining	1,765	+23.0
Construction	433	+42.43
Manufacturing	444	-5.7
Wholesale trade	1,678	+71.4
Retail trade	2,837	+11.65
Transportation and warehousing, and utilities	793	+25.28
Information	N/A	N/A
Finance, insurance, real estate, and rental and leasing	864	-42.32
Professional, scientific, management, administrative, and waste management services	N/A	N/A
Educational, health and social services	9,192	+5.62
Arts, entertainment, recreation, accommodation and food services	1,182	+32.51
Other services (except public administration)	233	+29.44
Public administration	2,769	+12.84

Notes:
Source - US Department of Labor, Bureau of Labor Statistics 2005.
N/A – Not Disclosed: Data do not meet Bureau of Labor Statistics or State agency disclosure standards

TABLE 3.13-7
INDUSTRY SECTOR EARNINGS TRENDS – PONDERA COUNTY

INDUSTRY	Total 2004 Wages by Sector (in thousands)	Trend between 2001-2004 (percent change)
Agriculture, forestry, fishing and hunting, and mining	748	-24.67
Construction	9,193	+14.88
Manufacturing	1,021	-23.7
Wholesale trade	3,117	+9.7
Retail trade	4,016	+15.43
Transportation and warehousing, and utilities	6,324	+9.03
Information	449	+39.44
Finance, insurance, real estate, and rental and leasing	1,908	+1.76
Professional, scientific, management, administrative, and waste management services	1,497	+6.4
Educational, health and social services	13,022	+4.48
Arts, entertainment, recreation, accommodation and food services	1,180	+21.65
Other services (except public administration)	523	-2.8
Public administration	847	+5.35

Notes:
Source - US Department of Labor, Bureau of Labor Statistics 2005

TABLE 3.13-8
INDUSTRY SECTOR EARNINGS TRENDS – TOOLE COUNTY

INDUSTRY	Total 2004 Wages by Sector (in thousands)	Trend between 2001-2004 (percent change)
Agriculture, forestry, fishing and hunting, and mining	4,287	+19.82
Construction	833	+33.28
Manufacturing	424	-6.2
Wholesale trade	2,759[a]	N/A
Retail trade	3,652	+33
Transportation and warehousing, and utilities	473	+1.94
Information	1,449	+54.3
Finance, insurance, real estate, and rental and leasing	2,087	+29.55
Professional, scientific, management, administrative, and waste management services	5,343	+27.8
Educational, health and social services	10,370	+20.34
Arts, entertainment, recreation, accommodation and food services	3,304	+47.3
Other services (except public administration)	373	-3.1
Public administration	8,130	+228.4

Notes:
Source - US Department of Labor Bureau of Statistics 2005.
[a] 2002 Data, No Data Available for 2004
N/A– Not Available: comparison data do not meet Bureau of Labor Statistics or State agency disclosure standards

TABLE 3.13-9
INDUSTRY SECTOR EARNINGS TRENDS – GLACIER COUNTY

INDUSTRY	Total 2004 Wages by Sector (in thousands)	Trend between 2001-2004 (percent change)
Agriculture, forestry, fishing and hunting, and mining	4,939	+90.62[a]
Construction	2,726	-5.05
Manufacturing	583	-15.87[a]
Wholesale trade	3,056	+29.66
Retail trade	8,102	+22.39
Transportation and warehousing, and utilities	3,081	-6.8
Information	309	+6.19
Finance, insurance, real estate, and rental and leasing	2,158	+13.04
Professional, scientific, management, administrative, and waste management services	2,195	+21.2
Educational, health and social services	27,113	+28.52
Arts, entertainment, recreation, accommodation and food services	12,640	+1.93
Other services (except public administration)	1,311	-13.8
Public administration	36,200	+11.47

Notes:
Source - US Department of Labor Bureau of Statistics 2005.
[a] – 2002 Data, No Comparison Data Available for 2001

Per capita personal income, or the amount of income that is received by a person from all sources, has generally increased for all of the counties within the analysis area (U.S. Department of Commerce 2006). For counties dependent on agriculture, increases or decreases in per capita income are typically attributable to the quantity and value of crops or livestock produced. For example, per capita income increased between 2001 and 2004 as a result of bumper crops of winter wheat and barley, particularly in Chouteau and Toole counties (**Table 3.13-10**).

TABLE 3.13-10
PER CAPITA PERSONAL INCOME TRENDS

County	Per Capita Personal Income – 2004	Percent Change in Per Capita Personal Income, 2003 - 2004
Cascade	$29,231	+5.9
Chouteau	$27,303	+13.6
Glacier	$20,637	+7.6
Pondera	$23,709	+4
Teton	$26,158	+6.6
Toole	$28,100	+12.3

Notes:
Source - Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, April 25, 2006.

Additional details regarding the social and economic activities within each of the counties located in the analysis area are provided in MATL (2006b) and summarized for each county below.

Cascade County

The economy of Cascade County is heavily influenced by the commerce and trade activities centered in and surrounding Great Falls, Montana's second largest city. This area provides the goods and services and other amenities drawn upon throughout the region. The largest private economic sector in the county is health care and social assistance, which accounts for nearly 24 percent of non-government employment. Another 14.2 percent of the labor force works in the retail trades. Malmstrom Air Force Base, located just to the east of Great Falls, is home to several thousand military personnel and their families and employs about 4.9 percent of the county's population (approximately 3,000 people). According to the USDA, there were 1,037 farms in Cascade County in 2002, a slight drop (1.2 percent) since the 1997 agricultural census (USDA 2004).

Median household income in Cascade County in 2003 was $34,471, or 100.1 percent of the state's median household income (USDA Bureau of Labor Statistics 2005). Approximately 13.9 percent of the county's residents lived below the poverty level during 2003 (U.S. Census Bureau estimates 2005b).

Property tax revenues made up over 48 percent of all county revenues in fiscal year 2004-2005. Public safety was the largest segment draw on the county budget. For fiscal year 2004-2005, Cascade County appropriated $2,356,823 to its road fund, $39,451 to its rural fire fund, $165,088 to its emergency medical fund, and $6,811,144 to the public safety fund (MATL 2006b).

Chouteau County

The largest economic sector in Chouteau County is agriculture, accounting for almost 33 percent of the industries within the county and occupying over 90 percent of the county land area (USDA 2004). Still, the number of farms decreased by about 3.9 percent between 1997 and 2002 (USDA 2004). Education, health and social services combined constitute the next largest industry sector, followed by retail trades.

Chouteau County received the most dollars of any Montana county in federal farm subsidies in 2003—over $33 million (Montana Department of Labor and Industry 2006). These subsidies reflect payments made for CRP lands, Loan Deficiency Payments, Crop Disaster Program, and the Livestock Compensation Program and reflected 20.6 to 32 percent of the reported per capita income in Chouteau County in 2003 (approximately $24,030). In 2004, the per capita income was $27,303, an increase of 23.6 percent from

2002 and 13.6 percent over 2003. Median household income in 2003 was $28,646, only 83.2 percent of the state average (USDA 2006). In 2003, 15 percent of the Chouteau County's population was estimated to be living in poverty (U.S. Census Bureau 2005b).

MATL provided DEQ with tables detailing county revenues and expenditures for the fiscal year ending June 2005 in its March 2006 submittal to the agency (MATL 2006b). In general, property tax made up nearly 50 percent of county revenues in fiscal year 2004-2005. Public works was the largest segment draw on the county budget. For fiscal year 2004-2005, Chouteau County appropriated $1,324,911 to its road fund.

Glacier County

Glacier County is home to the Blackfeet Indian Reservation and also encompasses the eastern portion of Glacier National Park. The presence of the park provides an important tourism draw to the area, which creates a higher degree of economic activity in the retail trade, accommodation and food services, and entertainment and recreation industry sectors. These sectors combined account for more than half the total private workforce, although government jobs, mostly tribal related, provide the greatest amount of employment (Montana Department of Labor and Industry 2005). Health care and social services are also a major industry sector (U.S. Census Bureau 2006), as is the oil and gas industry, which experienced a 150 percent increase in earnings from 2001 to 2004 (Montana Department of Commerce 2006). According to the USDA's 2002 census, 85.8 percent of the land in the county is in farms; although the total number of farms decreased slightly from 493 in 1997 to 472 in 2002.

Per capita personal income in 2004 in Glacier County was $20,637, an increase of 13.4 percent from 2002 (U.S. Department of Commerce 2006). Median household income in 2003 was $27,117 which was only 78.7 percent of the state average (USDA 2006). According to U.S. Census Bureau estimates, in 2003 25.6 percent of Glacier County's population was living in poverty. The only other county in the state with a higher poverty rate was Roosevelt County (U.S. Census Bureau 2005b).

Property tax made up nearly 38 percent of county revenues in fiscal year 2004-2005. Largest segment draws on the county budget include public safety, public works, and general government expenditures; all tapping between 28 to 30 percent of revenue. For fiscal year 2004-2005, Glacier County appropriated $926,559 to its road department fund, $1,124 to the Cut Bank Fire Department fund, and $495,242 to the ambulance fund (MATL 2006b).

Pondera County

Economic data from 2004 indicate that within Pondera County the largest economic sector was education, health, and social services, which employed 302 individuals that year. A report on the economic impact of the health sector in Pondera County (Oklahoma State University 2005) indicated that the bulk of the health care workers (244) are employed by Pondera Medical Center. Retail trade was also a major sector, with approximately 280 employees reported (U.S. Census Bureau 2006). Agriculture was also a large industry within the county with 20.2 percent of individuals employed in that sector. Nearly 75,000 acres of land in Pondera County are irrigated cropland and 86.6 percent of the land is in farms (USDA 2004). Principal crops include winter wheat and barley.

In 2004, the per capita personal income in Pondera County was $23,709, an 8.4 percent increase since 2002 (U.S. Department of Commerce 2006). Median household income in Pondera County was reported to be $29,362 in 2003, or 85.2 percent of the state average (USDA 2006). In 2003, 17.6 percent of Pondera County's population was estimated to be living in poverty (U.S. Census Bureau 2005b).

Property tax made up nearly 50 percent of county revenues in fiscal year 2004-2005. Largest segment draws on the county budget include public works and general government expenditures. For fiscal year 2004-2005, Pondera County appropriated $925,355 to its road fund and $20,891 to its rural fire district fund (MATL 2006b).

Teton County

Based on the U.S. Census Bureau's 2004 county business patterns study, retail trade establishments employ the largest percentage of the workforce in the county, followed by the health care and social assistances (U.S. Census Bureau 2006). However, these statistics do not take into account those establishments without employee identification numbers, which may include some farms. Of all the counties in the Project area, Teton County is the only one actually to see an increase in the number of farms between 1997 and 2002 (from 625 to 700, or 12.5 percent increase). This area of Montana is known for its high quality winter wheat and barley production. Much of the barley produced in Teton County is grown under contract with Anheuser-Busch. Another prominent contractor in the area is General Mills (Chouteau Acantha 2004).

Per capita personal income in 2004 was $26,158. Median household income in 2003 was $30,844, or 89.5 percent of the state average (USDA 2006). During the same year, 13.7 percent of Teton County's population was living in poverty according to U.S. Census Bureau (2005b) estimates.

Taxes and assessments (including property tax) made up nearly 48 percent of county revenues in fiscal year ending 2004. Public safety was the largest segment draw on the county budget. For fiscal year 2004-2005, Teton County appropriated $787,037 to its road fund, $64,893 to its Fire Fee District, $15,000 to its rural fire fund, and $3,245 to the Choteau fire fund (MATL 2006b).

Toole County

The largest economic sector in Toole County was education, health, and social services. Retail trades comprise the second largest employment sector, followed by accommodations and food service. Almost 90 percent of the land area of the county is farmland. Of the 405 farms in Toole County in 2002, 200 were oilseed and grain farms and 110 grew sugar beets, hay, and other types of crops. The remaining farms and ranches were primarily dedicated to beef cattle ranching and other animal production. Oil and gas extraction is also a major economic activity in Toole County, with about 11 percent of total private wages. The county is also home to the busiest port of entry on the Alaska-Canada Highway between eastern Washington and central North Dakota (Montana Department of Labor and Industry 2005).

Per capita personal income in 2004 was $28,100, an increase of 23 percent just from 2002 (U.S. Department of Commerce 2006). Median household income in 2003 was $29,840 which was 86.6 percent of the state average (USDA 2006). According to the U.S. Census Bureau (2005b), an estimated 14.1 percent of Toole County’s population was living in poverty in 2003.

Taxes and assessments (including property tax) made up about 39 percent of Toole County revenues in fiscal year 2004-2005, however intergovernmental revenues (state/federal) made up over 55 percent of county revenue that fiscal year. Largest segment draws on the county budget include public health and general government expenditures. For fiscal year 2004-2005, Toole County appropriated $910,275 to its road fund and $88,000 to its ambulance fund (MATL 2006b).

3.13.2.3 Local Resources

Local resources that were examined include emergency and medical services, law enforcement, and fire response. Resources such as housing and schools were not examined in detail because of the relatively low number of employees expected through the duration of Project construction, and the relatively short duration of activities occurring in a given locale make it unlikely that these resources would incur any measurable direct impacts. Service and retail providers that would experience impacts as a result of the construction and operation of the proposed Project or alternatives include lodging, restaurants, and gas stations. The likely principal communities that would serve project workers include Great Falls (Cascade County), Conrad (Pondera County), Cut Bank (Glacier County), and Shelby (Toole County). Each of these towns has lodging and dining options as well as grocers and gas stations.

Cascade County

Emergency and Medical Services: Benefis Healthcare provides care to approximately 225,000 people in a service area covering 15 counties in north-central Montana. Benefis Healthcare offers a full range of medical services, including a Level II Trauma Center. Facilities include 502 beds at its two campuses. Benefis also operates the Williams-Ario Regional Emergency and Trauma Center in Great Falls. This additional facility provides 19 emergency examination rooms and an additional seven non-urgent care rooms. The emergency department is staffed with nine board-certified or -eligible physicians. The Fast track program has four family nurse practitioners who treat non-urgent patients.

Flight services are available through Mercy Flight, which operates both helicopters and airplanes. Mercy Flight crews also respond on-site to bring patients from isolated areas or accident scenes to the Regional Emergency Center.

Law Enforcement: The Cascade County Sheriff's Office covers all areas within the county, with the exception of Great Falls. The Sheriff's office has a force of 34 officers. The City of Great Falls is covered by the City Police Department, with 82 officers and 65 patrol and support vehicles available to handle crime and provide educational services.

Fire Response: The Great Falls Fire Rescue consists of 65 uniformed firefighters, in addition to the Fire Chief, Assistant Chief, and several other staff. All suppression firefighters are certified EMTs, and 19 of them are also certified as paramedics. There are four stations in total. The stations combined have six 1,250-gallon-per-minute fire engines, a water tender, a snorkel truck, a rescue vehicle, and hazardous materials response equipment. Additional fire services in Cascade County include:

- Sun River Fire Service Area
- Vaughn Volunteer Fire Department
- Black Eagle Volunteer Fire Department
- Malmstrom AFB Fire Department
- Gore Hill Volunteer Fire Department
- Cascade Volunteer Fire Department

Chouteau County

Emergency and Medical Services: The Missouri River Medical Center (MRMC) in Fort Benton provides a seven-bed acute care hospital, emergency room, laboratory, and radiology department. The MRMC Emergency room is available 24 hours a day, 7 days a week, and is staffed by a registered nurse with a physician on call. MRMC coordinates emergency services with Memorial Ambulance, Geraldine Ambulance, Benefis Healthcare, Mercy Flight, and Chouteau County.

Law Enforcement: The Chouteau County Sheriff's Office covers the towns of Big Sandy, Loma, Carter, Highwood, Square Butte, Geraldine, and all rural areas within Chouteau County. Fort Benton has its own city police department. The county sheriff's office has a force of nine full time officers and a reserve force of eight and is responsible for the investigation and prevention of crime, coroner duties, fire warden, civil process, bailiff, search and rescue, and emergency services response. Eight patrol cars and two suburbans are available for patrol (MATL 2006b).

Fire Response: There are eight volunteer fire departments within Chouteau County located in Fort Benton, Big Sandy, Geraldine, Highwood, Loma, Carter, Kness, and Elim. There are also five volunteer quick response units on call within the county for emergency and fire situations and three ambulance services. They are located in Fort Benton, Big Sandy, and Geraldine (MATL 2006b).

Glacier County

Emergency and Medical Services: Northern Rockies Medical Center in Cut Bank is a full service medical center with a 25-bed hospital. There are two fulltime physicians, one nurse practitioner, and several registered nurses at the hospital. There are three ambulances in the county (MATL 2006b).

Law Enforcement: The Glacier County Sheriff's Office covers all areas within the county, though Cut Bank has its own police department as well. Glacier County Sheriff's Office has 12 officers and seven reserves. There are 12 vehicles available for patrol. The City of Cut Bank Police Department employs six officers and has five vehicles available for patrol.

Fire Response: Cut Bank Volunteer Fire Department serves the City of Cut Bank and eastern Glacier County. The department has 25 volunteer firefighters, two city trucks, three rural trucks, and a rescue truck. The Cut Bank department also provides equipment and training to the Del Bonita Volunteer Fire Company. There are three rural trucks at this location, but a variable number of volunteer firefighters. Other departments in the county include the Browning Volunteer Fire Department and the Babb Volunteer Fire Department (MATL 2006b).

Pondera County

Emergency and Medical Services: Pondera Medical Center, located in Conrad, is a 20-bed acute care facility with a full range of services. There are five local physicians and five allied staff at the facility along with a variety of visiting specialists. Pondera Medical Center provides 24-hour emergency room coverage staff by a physician assistant and nurse practitioner, with physician backup. Pondera County Ambulance, staffed with emergency medical technicians, serves the Pondera County area with round-the-clock emergency services. The ambulance also provides transportation services for patients to other facilities, as necessary (MATL 2006b).

Law Enforcement: The Pondera County Sheriff's Office covers all areas of the county with the exception of Conrad and reservation lands. The sheriff's office has a force of eight fulltime officers and eight vehicles are available for patrol. Conrad is covered via the City Police Department, with a staff of five and two vehicles available for patrol. The Bureau of Indian Affairs handles law enforcement on reservation lands in the western part of the county.

Fire Response: There are four fire departments throughout Pondera County. These include the Brady Volunteer Fire Department, the Conrad Volunteer Fire Department, the Dupuyer Volunteer Fire Department, and the Valier Volunteer Fire Department. Combined, the four departments have 79 volunteer firefighters and 16 trucks. There is also one department located in Heart Butte that falls under the Bureau of Indian Affairs.

Teton County

Emergency and Medical Services: Teton Medical Center is a 10-bed critical access hospital and 36-bed extended care facility located in Choteau. The hospital provides 24-hour emergency services, with two rooms staffed by physicians, physician assistants, and nurses (MATL 2006b).

Law Enforcement: Teton County Sheriff's Office covers all of the areas within the county. The office has a force of nine, including the sheriff and under sheriff, and nine vehicles available for patrol.

Fire Response: There are five fire departments in Teton County. These include the Choteau Volunteer Fire Department, the Dutton Rural Fire Department, the Fairfield Rural Fire District, the Pendroy Volunteer Fire Company, and the Power Volunteer Fire Company (MATL 2006b).

Toole County

Emergency and Medical Services: Marias Medical Center is a combined 20-bed acute care hospital with nursery, maternity rooms, intensive care and critical care units, and a 68-bed skilled nursing facility. The emergency room has a physician on call 24 hours a day, and a surgeon and anesthestist are available, as needed. The facility has 15 RNs on staff. Four ambulances serve Toole County, including one that is housed in Sunburst (35 miles north of Shelby). There is a helipad at the hospital, and transfers to fixed-wing aircraft can be made at the airport just north of Shelby.

Law Enforcement: Toole County Sheriff's Office covers all of Toole County, including Shelby. The office has a force of 12 including the sheriff and six vehicles available for patrol.

Fire Response: There are two volunteer fire departments located within Toole County. The Shelby Volunteer Fire Department provides fire services for Shelby and southern Toole County and has 21 firefighters, three city trucks, and five rural trucks available. There is also a volunteer fire department that serves northern Toole County located in Sunburst. The department has 21 firefighters, two local trucks, one city truck, one water tender, and five rural trucks available.

3.13.3 Environmental Impacts

The socioeconomic impacts of Alternative 2 and the other action alternatives can be divided into (1) those that are an immediate result of project construction such as an influx of workers to the area to complete the project; (2) those related to operation of the proposed Project or alternatives, such as impediments to property owners' ability to make full and unimpeded economic use of their land and the addition of taxable property to state and county budgets; (3) those that may be anticipated from any corollary energy generation projects that would arise as a direct result of the presence of the proposed Project; and (4) those related to increased availability of power transmission options. Each of these types of effects is discussed in more detail below. Consequences more directly related to the changes that would occur to land use are discussed in more detail in Section 3.1.

3.13.3.1 Alternative 1 - No Action

Under the No Action alternative, neither the proposed Project nor any of the action alternatives would be constructed. Under this scenario, benefits to the counties in the analysis area from project-generated property taxes (see **Table 3.13-11**) and any benefits from the increased utilization of local goods and services would not occur. The employment opportunities that would be created during construction of the project would also not occur. Wind generation projects providing up to 600 MWs of electricity potentially expected to develop as a result of the construction of additional transmission capacity (also described in Section 3.13.3.2) would not be built in the immediate future; revenue to the counties from these projects would not materialize, nor would the associated temporary and permanent employment opportunities.

Benefits of the No Action alternative would be felt by local land owners who would be able to utilize their land without incurring the inefficiencies caused by working around transmission structures. Conversely, local landowners would not receive easement damage payments for the structures.

3.13.3.2 Alternative 2 – Proposed Project

Construction Phase: Approximately 55 employees would be needed to complete the Project within a 6-month timeframe (MATL 2006b). The local impact of construction activity would vary depending on whether the local labor pool is used or whether workers come from out of the region. An unknown number of those workers would potentially be locally procured, while other jobs may require skills that are unavailable in the local labor pool (MATL 2006b). Where local workers are hired, there would be a small but positive effect to local area personal income figures for the duration of construction and potentially a reduction in unemployment in the analysis area's counties. According to MATL (2006b), about two-thirds of the hired construction workers would earn between $20 and $26 per hour and the project would provide in excess of 200,000 person-hours of construction employment. Assuming an average pre-tax hourly wage of $23, construction employment alone may conservatively generate $4.6 million over the construction time period of approximately 6 months. Earned wages from local workers would also be a source of income tax to state and federal taxing authorities, although this revenue may simply represent a replacement of similar revenue amounts generated by jobs previously held by project contractors.

Workers would be dispersed along the chosen alignment, rather than all concentrated in one area at one time (**Table 2.3-3**). For example, some workers would concentrate on digging and setting poles, while other crews would follow at a later time to string line. Similarly, line installation would also be dispersed. Secondary, or induced positive impacts would be created by the increase in use of the local retail business and service industries. However, given the few workers and dispersed nature of the construction activities associated with the proposed Project and action alternatives, it is likely that while the secondary impacts in any given town along the alignment would be beneficial, they would also be small and short term.

No direct impacts to the regional demographics are expected to occur as a result of the project since some of the workers are expected to already be residing in the area and others would be dispersed over the breadth of the Project area. The dispersed nature of the construction phase of the project also means that local goods and services such as lodging facilities, restaurants, and gas stations would not be over-utilized to the degree that additional employment or additional facilities would be required to maintain pre-Project levels of service. Interviews conducted by MATL representatives with other community service workers at hospitals and law enforcement agencies also indicated that these types of services would not be unduly taxed by the influx of workers to the region (MATL 2006b). In addition, construction costs would ultimately be paid for by the energy shippers, not by Montana rate payers.

As described more fully in Section 3.1 (Land Use), the construction phase of the action alternatives would require limited access road development to reach otherwise inaccessible tower locations, overland driving to geographically accessible locations, and other activities related to structure placement. Temporary disruptions would occur to landowners, including brief inaccessibility to portions of their property in the right of way. Heavy equipment use along the right of way would create noise (discussed in Section 3.12), dust, and exhaust that may create a temporary nuisance to property owners working or residing close to the construction activities. Economic costs associated with such disruptions would be minimal due to the brief time required at each construction location.

Operation Phase: Portions of the proposed Project would be constructed on easements crossing irrigated and non-irrigated cropland and rangeland. Disruptions to farming practices would be expected to occur, including

- Decreases in farming efficiency caused by pole placement through fields;
- Increases in herbicide and pesticide spraying costs;
- Reduced coverage of aerial herbicide and pesticide resulting in increased weed pressure;
- Disruptions to GPS-driven equipment; and
- Reduced property values.

Because action alternatives are located in areas accessible by overland driving, few permanent access roads would be needed. However, where repeated compaction by heavy equipment occurs over fine-grained soils, previously productive cropland may require additional labor measures (such as tilling) to restore crop productivity to pre-construction levels.

Disruptions such as these would result in external costs associated with the creation of non-productive areas, extra diesel, pesticides and herbicides, modifications to GPS networks infrastructure (that is, repeater installation/modification and tractor modifications), additional stress and increased flight time during aerial applications of fertilizer and pesticides due to the presence of tower and conductor obstructions, and real or perceived impacts to property values (MATL 2006b). Few recent studies are available that quantify the cost of these types of infringements to property owners with agreed-upon accuracy; however, a study conducted by Ontario Hydro in 1979 showed that the greatest financial effect of the towers comes as a result of the creation of a non-productive area, followed by time loss, crop damage, and material loss (Scott 1980). While the Ontario Hydro study attempted to quantify these losses, the values presented in the study are in terms of the averages between 1974 dollars for western Ontario and 1975 values for eastern Ontario. Therefore, it would be difficult to convert these monetary values to today's U.S. dollar value for the specific types of farm and ranchland uses in northern Montana . However, in terms of net impact, pole payments for each structure and annual payments to offset the increased cost of farming around the structures made by the Project proponent to the landowner would provide monetary mitigation for these economic losses. These payments also provide a new, predictable, and consistent revenue stream to landowners.

Property values depend on many factors, and it is not possible to assign definite figures to potential reductions in property values. A review of recent studies indicates that property values could decrease slightly, might not change, or may increase (EPRI 2003). Some reduction in property values due to the presence of the transmission line could occur as a consequence of the visual externalities of the towers, perceived health risks associated with high voltage, and effects on farming efficiency. Property devaluation would likely be more evident on properties immediately adjacent to the line, particularly those where residences are close, or the land is farmed. However, most of the MATL line extends across remote ranch and cropland. For these properties, devaluation based on visual impacts or perceived health risks would be negligible and any reduction in value due to the loss of productive land or farming efficiency would be at least partially off-set by negotiated compensation.

MATL proposes to use experienced operations and maintenance (O&M) contractors, possibly outsourced from other regionally-located utility companies, for ongoing maintenance of the transmission line once it is constructed. This may provide additional employment opportunities if the selected contracting company does not currently have the personnel resources to meet MATL's O&M requirements. The number of employees that would potentially be hired is unknown at this time; however, the estimated wages for such personnel are expected to be in the $25 per hour range (Pfister 2007). A small number of new residents working on the MATL project might move into the study area as a result of the transmission line.

In Montana, property tax is the primary source of funding for local governments. The Project would be centrally assessed (as a single unit) at 12 percent, then the revenue would be apportioned to different districts based on mileage of line within each district. Property taxes assessed on the Project would include the value of the line and in cases where MATL purchases rights of way, the property would also be included in the value (otherwise, the existing landowner continues to be responsible for property taxes on the land). Applicable mill levies would also be applied to the property taxes paid within each district. The approximate amount of property taxes potentially available to each county within the analysis area was calculated based on an estimated value of $363,284 per mile and the approximate mileage of the proposed alignment and projected alternatives (Mullen 2006). As shown in **Table 3.13-11,** tax revenue from the line may generate from $121,688 in Chouteau County to a little over $1 million in Pondera County. Since property taxes associated with the transmission line are centrally assessed, they are tied to project revenue rather than the age of individual or collective infrastructure components. Therefore, as long as the line is utilized and maintained, no depreciation is expected to occur and the tax revenue benefits available to each county are expected to remain unchanged over time (Dodds 2006).

In addition to property taxes, the Project would also be subject to the Wholesale Energy Transaction Tax (WET), which is imposed by the State of Montana at a rate of $0.00015 per kilowatt hour (kWh). Revenue generated from this source is directed to the state's general fund, which is distributed to projects (primarily school districts) throughout the state (Dodds 2006).

Increased Availability of Power Transmission Options: The operation of additional energy transmission lines in Montana is expected to provide an additional avenue for transferring energy between Montana and Canada. Without this or other future transmission lines, for power to travel between Montana and Alberta, that power must first go through Idaho, Washington, and British Columbia. Energy shippers incur additional transmission tariffs that would not be incurred if the MATL line were constructed. At the time of this study, MATL had recently announced that the expected permitted firm capacity of the Project had sold out (MATL 2006b). Increased energy transactions along with more efficient paths of conveyance could increase the competition between suppliers and potentially result in lower rates to electricity consumers. However, the amount of transmission capacity that the MATL line would open up between Montana and Alberta would be relatively small compared to the total amount of interconnection capacity Montana currently has with other states. Therefore, it is likely that both potential increases in competition and potential decreases in electricity prices as a result of the proposed line would be limited or non-existent.

Conversely, PPL Montana is the largest supplier of Montana-consumed energy. Following the state's deregulation in 1997, FERC gave PPL Montana the authority to sell electricity at substantially higher market-based rates rather than the less-expensive cost-based rates. Thus there may not be any consumer benefit brought about by the proposed Project in terms of Montana electricity consumers receiving lower rates.

Corollary Energy Generation Projects: Additional socioeconomic impacts that would be incurred as a result of new energy generation projects enabled by the existence of the proposed MATL line would be similar to those described here for the MATL line. For example, each new project would include the beneficial impacts realized by local economies due to the presence of construction and operation workers moving to the region and each project's potential utilization of local labor pools. These benefits would increase local employment opportunities and increase local economic transactions as these workers and their families draw upon service and commodity providers. Each new project would also create new facilities subject to state and local taxation, thus further increasing each county's tax revenue. Benefits may also be realized to the rate payer due to increased competition and abundant energy supplies that may become available as new wind generation facilities come on-line. However, each new generation facility would also require land commitments that could remove a small amount of land from production. The lease payments for wind sites are considered to be higher than the value of the land removed from crop and cattle production. These new projects also would provide a new revenue stream to landowners.

3.13.3.3 Alternatives 3 and 4 – MATL B and Agency Alternative

The socioeconomic impacts described above are essentially equal for all of the alternatives with the exception of differences in the estimated property tax revenue available to each affected county depending on the mileage of the line that would ultimately be constructed within each county's jurisdiction (**Table 3.13-11**).

3.13.3.4 Environmental Justice

Executive Order 12898 states that all federal actions must evaluate a project relative to minority and low-income populations to ensure that these groups are not disproportionately impacted by adverse health and environmental consequences of a proposed Project. The proposed Project requires permits from the federal government and must satisfy this directive.

MATL conducted an assessment of environmental justice issues in accordance with standard practices set forth by the U.S. EPA (1998) and provided the findings in their MFSA application to DEQ (MATL 2006b). Based on their findings, no specific minority or low-income populations are crossed within the Project analysis area. As presented in the application document, significant impacts for this project are assessed relative to three criteria:

- Criterion 1: An alternative is sited to disproportionately negatively affect low-income or minority populations;
- Criterion 2: An alternative disproportionately reduces the ability of low-income or minority persons to make a living;
- Criterion 3: Native American cultural or religious sites are irreparably damaged or destroyed.

TABLE 3.13-11 TAX BENEFIT ESTIMATES							
	Alignment Length (Miles)	Value $/Mi.	Estimated Value in County (BxC)	Class 9 Tax Rate (Valuation Ratio): 12%	Taxable Value (DxE)	Avg. Rural Mill Levy	Property Tax (FxG)
Cascade							
Alternative 2	12.76	$363,284	$4,635,504	0.12	$556,260	0.50412	$280,422
Alternative 3	12.31	$363,284	$4,472,026	0.12	$536,643	0.50412	$270,533
Alternative 4	19.81	$363,284	$7,196,656	0.12	$863,599	0.50412	$435,357
Chouteau							
Alternative 2	5.87	$363,284	$2,132,477	0.12	$255,897	0.43959	$112,490
Alternative 3	10.21	$363,284	$3,709,130	0.12	$445,096	0.43959	$195,660
Alternative 4	0	$363,284	$0	0.12	$0	0.43959	$0
Glacier							
Alternative 2	40.41	$363,284	$14,680,306	0.12	$1,761,637	0.53745	$946,792
Alternative 3	37.34	$363,284	$13,565,025	0.12	$1,627,803	0.53745	$874,863
Alternative 4	40.56	$363,284	$14,680,306	0.12	$1,761,637	0.53745	$946,792
Pondera							
Alternative 2	45.69	$363,284	$16,598,446	0.12	$1,991,814	0.52162	$1,038,970
Alternative 3	44.44	$363,284	$16,144,341	0.12	$1,937,321	0.52162	$1,010,545
Alternative 4	52.01	$363,284	$18,894,401	0.12	$2,267,328	0.52162	$1,182,684
Teton							
Alternative 2	25.16	$363,284	$9,140,225	0.12	$1,096,827	0.4991	$547,426
Alternative 3	17.32	$363,284	$6,292,079	0.12	$755,049	0.4991	$376,845
Alternative 4	27.26	$363,284	$9,903,122	0.12	$1,188,375	0.4991	$593,118

Notes:
Sources: Mullen 2006
Montana Department of Revenue 2004

MATL's findings relative to Criterion 1, based on comparing U.S. Census block-level data (the smallest geographic unit for which the U.S. Census tabulates data), show that ethnic and economic demographics are relatively similar among the alternatives and between all of the alignments and the surrounding comparison communities with the exception of the Blackfeet Reservation to the west of the Project analysis area. The percentage of Native Americans on the Blackfeet Reservation and the poverty level are much higher than in the general comparison region. In addition, Heart Butte, which is in the region but not within the Project analysis area, is a low-income and minority community. High poverty levels in other parts of the Project analysis area, such as western Toole County, are not related to specific communities but rather to generally low-paying jobs in a dispersed rural environment. None of the alternatives negatively affect low-income and/or minority populations in a disproportionate manner to the surrounding communities or region; consequently, there is no significant impact relative to Criterion 1 (MATL 2006b).

MATL's findings relative to Criterion 2 show that employment in the Project analysis area is related to dispersed activities such as farming, ranching, or commuting to jobs in surrounding towns and cities. Construction of the transmission line could result in short-term employment opportunities for the local workforce. None of the alternatives would disproportionately reduce the ability of low-income or minority populations to make a living, resulting in no impacts relative to Criterion 2 (MATL 2006b).

Impacts to cultural and religious sites within the Project study area are described in Section 3.14. No impacts relative to Criterion 3 would occur as a result of the proposed Project or the other action alternatives.

3.14 Paleontological and Cultural Resources

3.14.1 Analysis Methods

Paleontological and cultural resources provide valuable information about the behavior of past plant, animal, and human populations and their environments. Paleontological resources are fossilized plant and animal remains that are rare and have scientific research value. Cultural resources include archaeological sites, historic sites, architectural properties, traditional cultural properties, districts, landscapes, structures, features, or objects resulting from human activity. Both resources are nonrenewable and irreplaceable, and, for state-owned land, Montana state law requires that inventory for and evaluation of these resources occur before they are impacted by ground disturbing activities or removed from state ownership.

Federal regulations that were considered for this analysis include the National Historic Preservation Act of 1966, the Archaeological and Historic Preservation Act of 1974, the Archaeological Resources Protection Act of 1979, the American Indian Religious Freedom Act of 1977, the Native American Graves Protection and Repatriation Act of 1990, and Executive Orders relevant to cultural resources. State legislation considered includes the Montana Antiquities Act and the Montana Human Remains and Burial Site Protection Act.

Known prehistoric cultural resource sites (hundreds to thousands of years old) and historic sites (at least 50 years old) have been documented in the project area. The number and variety of sites increases through time due to population increases and the effects of immigration. Existing sources of information were consulted in order to analyze paleontological and cultural resources, as described below.

Information Resources

The Montana Antiquities Database maintained by the Montana State Historic Preservation Office (SHPO) in Helena was the primary source for information about specific cultural resource sites and paleontological localities in the project study area. The Cultural Resources Information System (CRIS) contains summary information about previously recorded resources by site type and township, range, and quarter section. The Cultural Resources Annotated Bibliography System (CRABS) contains listings of previous resource inventories by township, range, and section. A search for sites listed in the National Register of Historic Places was conducted through SHPO and on line through the National Park Service, as appropriate.

A variety of literature references including Frison (1991, 2001), Greiser (1984, 1994), Hanna (2003), Malone and Roeder (1976), Montana State Engineer's Office (1964), Montana Water Resources Board (1969), Schwantes (1996), Toole (1959), and Walker and Sprague (1998) were used in preparation of sections of this environmental review related to paleontology, prehistory, and history. Information from a Class I cultural resources inventory (Petersen and Ferguson 2006) was also incorporated.

Analysis Area

The analysis area for paleontological and cultural resources is at least 480 square miles with a research area extending 2 miles to either side of the proposed and alternative alignments (figures showing these alignments are provided in Chapter 2).

In the Great Falls area, the lacustrine basins and related features are interspersed with areas of nearly level to steep soils on terraces, fans, and benches mixed with strongly sloping to steep soils on dissected sedimentary bedrock plains and hills. From just north of the Cascade County line to the Canadian border, the analysis area crosses the undulating to strongly rolling topography of the Glaciated Missouri Plateau section of the Great Plains physiographic province. This part of the area is also interspersed with nearly level soils in lacustrine basins surrounded by strongly sloping soils on terraces, fans, and benches. The lush grasslands once found in the area during much of the prehistoric past provided sufficient food for large herds of bison, antelope, and deer, with elk found in or near forested areas closer to the mountains or in the river breaks. These animals were not only food sources, but also provided materials for clothing, tools, and shelter. Grizzly and black bear were likely common and there was a wide variety of game birds and migratory water fowl. Other plant resources would provide roots, bulbs, fruits, berries, greens, and leaves for eating, making teas, and for medicinal purposes. Stone material left behind by glaciers or exposed by erosional episodes was used for hide anchors on tipis, piled for use as cairns or alignments for animal drive lines, and worked into stone tools.

Cultivation of much of the analysis area for more than the past century has impacted many of the shallow prehistoric cultural resource sites such as tipi rings or campsites in areas of little soil development. Intact prehistoric sites can be anticipated in areas of deep spoils either on terrace or bench surfaces or in drainages where redeposited soils would protect them. Historic homestead, farm, or ranch buildings or foundations and related features or structures might be more visible in the agricultural areas.

3.14.2 Affected Environment

Paleontological Sites

A fossil is defined as the remains, trace, or imprint of a plant or animal that has been preserved in a geologic context. These fossils are grouped into categories including: trace, plant, invertebrate, fish, amphibian, reptile, dinosaur, bird, mammal, and vertebrate. A trace fossil (ichnofossil) is a track, trail, burrow, or tube formed by the activity of an animal. Coprolites, or fossilized dung, are also trace fossils. Fossilized plants occur as physical remains (petrified wood) or imprints (leaf impressions). Stromatolites (laminated algal mounds) and cyanobacteria (blue-green algae) are included in the plant category. Invertebrates are animals without backbones that inhabit marine, freshwater, and terrestrial environments, and are also found in the study area.

The geologic formation with the highest probability of containing fossils is the Two Medicine Formation. The only other formations with low to moderate probability of containing fossils include the Eagle, Kootenai, and Virgelle. The remaining formations or geologic types within the study area have little or no potential to contain fossils. Areas within the Two Medicine, Eagle, Kootenai, and Virgelle formations with potential to contain fossils primarily occur on steep exposed slopes above major river channels north from the Conrad area. In general, the distribution of fossils has not been determined at other locations within the Project study area since most of the Cretaceous rocks are covered by 1 to 15 feet of glacial deposits and no paleontological fieldwork is reported. However, the likelihood of encountering new fossil types of significance to the scientific community is thought to be low because of the low amount of disturbance to deeper layers.

Cultural Sites

Known historic site types in the analysis area likely include: exploration and overland migration sites such as trails (likely Native American in origin), river fords, wagon roads, encampments, or geologic/geographic landmarks; inscriptions including pictographs, petroglyphs, or tree carvings; transportation sites such as late nineteenth-early twentieth century roads, railroad engineered features (bridges, trestles, ballast, track and ties) and construction camps; isolated trapper cabins; homesteading, ranching, and farming sites such as residences (including foundations), outlying buildings and structures, cultural landscape elements (including fences, field/pasture patterns, stock ponds and dams, stock trails and river fords), irrigation structures, and artifact scatters; mining and mine related sites; and abandoned town sites including foundations and trash dumps.

Summary of Previously Recorded Data

A Class I review of previously recorded cultural resources and previous cultural resource inventories for the MATL analysis area indicates that there are known prehistoric and historic cultural resources in or near alternatives 2 and 3 (Petersen and Ferguson 2006). An additional Class I search for previously recorded cultural resources in sections containing Alternative 4 was conducted in November 2006. All information is summarized in **Table 3.14-1**. The searches are computerized searches of records maintained by the SHPO using township, range, and section legal descriptions. The resulting data indicate the presence or absence of cultural resources in a section but not necessarily on the alignment of a specific alternative.

TABLE 3.14-1
RESULTS OF CLASS I INVENTORY

Alignment	**Consensus Determination of Eligibility**	**No Determination or Unknown Eligibility**	**Not Eligible (Determined by SHPO)**
Alternative 2			
Prehistoric Sites			
Tipi Ring Sites	24PN24	24TT1008 24PN21 24PN5 24GL55	24PN112
Buffalo Jumps	--	24GL348 24GL587	--
Cairn Sites	--	24GL1032	--
Historic Sites			
Historic Road/Trail	24CA416	24CA645 24PN83	--
Railroads	24GL191	--	--
Railroad/Stage routes	24PN114	24PN34	--
Bridges	--	24PN46	--
Homesteads/ Farmsteads/ Residences	--	24PN119	--
Irrigation Systems	24PN109, 24PN111	24PN88	--
Alternative 3			
Prehistoric Sites			
Tipi Ring Sites	24PN24	24PN21 24GL55	--
Buffalo Jumps	--	24GL348 24GL587	--
Cairn Sites	--	24GL1032	--
Historic Sites			
Historic Road/Trail	24CA416	--	--
Railroads	24GL191	--	--
Railroad/Stage routes	24PN114	--	--

TABLE 3.14-1
RESULTS OF CLASS I INVENTORY

Alignment	**Consensus Determination of Eligibility**	**No Determination or Unknown Eligibility**	**Not Eligible (Determined by SHPO)**
Bridges	--	24PN46	--
Homesteads/ Farmsteads/ Residences	--	24PN82	24PN115 24PN116
Irrigation Systems	24PN87, 24PN109, 24PN111	--	--
Historic Oil Refinery	24PN117	--	--
Unknown Historic	--	24TT1006 24PN20	--
Alternative 4 - Segments Prehistoric Sites			
Tipi Ring Sites	--	24CA194 24CA195 24CA196 24TT1008 24PN773 24PN61	--
Lithic Scatter	--	24CA192 24CA193	--
Camp Site	--	24CA445 24CA494	--
Historic Sites			
Historic Road/Trail	24CA416	24PN83	--
Railroads	24GL191	--	--
Homesteads/ Farmsteads/ Residences	--	24CA190 24CA191 24CA199 24PN91 24PN95	--
Irrigation Systems	--	24PN551 24PN88	--
Historic Trash Dump	--	24PN62	--
Mining	--	24CA976	--
Historic Transmission Line	24CA1040	--	--

Note: -- No reported site

In total, nine sites, one prehistoric and eight historic, are eligible for the NRHP on the basis of consensus determination between the SHPO and a lead federal or state agency. Cascade County contains the eligible Rainbow Dam Road 24CA416, which is located in sections containing alternatives 2, 3, and 4. Site 24PN24 is an eligible tipi ring site along both Alternative 2 and Alternative 3 in Pondera County. Sites 24PN109 and 24PN111 are historic irrigation systems located in Pondera County intersecting Alternative 2 and 3. Two eligible sites located in Pondera County are an historic railroad (24PN114), along Alternative 2 and 3 and an historic oil refinery (24PN114) along Alternative 3. Site 24GL191 is the Great Northern Railroad; now part of the Burlington Northern-Santa Fe, located in Glacier County along alternatives 2, 3, and 4. While the exact route of the Lewis and Clark National Historic Trail through the analysis area has not been identified, it is known that it followed the Marias River and is a resource of concern.

3.14.3 Environmental Impacts

Paleontological Resources

As part of MATL's mitigation program, pre-construction reconnaissance would be conducted in areas where potential paleontological or fossil discovery exists. If found, fossil data would be recorded by trained professionals (with landowner permission). Under these conditions, the project may result in the beneficial impact of unknown, or little studied fossils being discovered (MATL 2006b).

Direct effects to paleontological resources from development projects such as MATL include earthmoving or ground clearing activities, blasting of bedrock for tower foundations or access roads, boring for geotechnical surveys or placement of guy wires, and pedestrian or vehicular traffic. Indirect effects of projects such as MATL include access to areas that were formerly not accessible. Access can lead to intentional damage to paleontological resources such as unauthorized collecting, theft, and defacement, and result in the loss of information and destruction of the resource. An unanticipated discoveries plan that addresses discovery of paleontological resources in high probability areas during construction would be developed prior to project implementation (see **Appendix F**).

Cultural Resources

Previous cultural resource inventories and/or recording of properties in the broader MATL study area resulted in no properties listed in the NRHP being located on any of the alternative alignments. A segment of one NRHP-listed property, the Mullan Road (24CA89), is reportedly located in a section adjacent to the southern end of Alternatives 2 and 3 on the Benton Lake National Wildlife Refuge. This cultural resource site has never been located and recorded on the ground. It is recommended that if either alternative is selected the area be thoroughly reviewed for intact portions of the property.

The recommended treatment of either NRHP-listed or eligible cultural resource properties is avoidance, if at all possible, and protection. Many of the known, NRHP-eligible cultural resource sites within or crossed by the various alternatives are either limited in size or are linear sites. Direct impact to these sites can likely be avoided by adjusting the location of individual structures and roads.

Locations of Traditional Cultural Properties or potential locations identified by knowledgeable tribal members should be avoided. Traditional Cultural Properties or sacred sites are places that have traditional spiritual values for Montana Native people (Indian tribes or Indian religious practitioners) that are reverently dedicated to a person or object or event or activity and are secured against violation or infringement or interference.

In order to protect and preserve Indian religious practices, Executive Order 13007 and other laws and Executive Orders of the U.S. Government require that, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, agencies should accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners; avoid adversely affecting the physical integrity of sacred sites; and where appropriate, maintain the confidentiality of sacred sites.

In the MFSA application, MATL stated that during a meeting Blackfeet Tribal representatives stressed the need to evaluate the proposed Project’s potential to impact traditional landscape and land use values. Inclusion of tribal monitors during cultural surveys and/or review of cultural resource findings by Tribal Historic Preservation Office (THPO) personnel were suggested to assist in appropriate treatment of prehistoric findings.

Cultural resource properties where the NRHP eligibility is unknown, has not been determined, or is unresolved can either be avoided, if possible, or subjected to sufficient investigation to determine or resolve eligibility.

If Alternative 2, 3 or 4 is selected, then unevaluated cultural resource properties along the alignment should be individually evaluated in terms of Project effect. In addition, an intensive cultural resource inventory of areas not previously inventoried to Montana SHPO standards would be necessary to comply with regulations in the Montana Antiquities Act, as amended (1995). Portions of a selected alternative along or within one-half mile of rivers, flowing streams, lakes, springs, or seeps should be considered high probability areas especially for prehistoric cultural resource sites. Such areas may also be more likely to contain historic sites, although intact homesteads may be more broadly distributed based on the system of patenting land in the late nineteenth and early twentieth centuries. Certain topographic features, such as those conducive to buffalo jump sites or high points for observation, should also be considered likely areas to contain prehistoric sites.

Areas least likely to contain cultural resource sites or NRHP-eligible sites are those areas far from reliable water and those areas where food or tool making resources would not occur. While areas subjected to plowing for farming may be less likely to contain intact cultural resource sites, plowed areas of well-developed soil may still contain intact prehistoric cultural resources.

Direct effects to cultural resource sites from development projects such as MATL include earthmoving or ground clearing activities and pedestrian or vehicular traffic. There is the potential for visual impacts to above-ground resources, such as historic buildings or houses. Indirect effects of projects such as MATL include soil erosion from earthmoving activities and access to areas that were formerly not accessible. Access can lead to intentional damage to cultural resource sites such as looting and vandalism, including unauthorized relic collecting, theft, and defacement, and result in the loss of information and destruction of the resource.

An unanticipated discoveries plan that addresses discovery of artifacts or cultural resource sites during construction would be developed prior to project implementation (see **Appendix F**).

3.14.3.1 Alternative 1 – No Action

Under the No Action Alternative, the MATL project would not be constructed. Thus there would be no impacts to cultural resources or any Traditional Cultural Properties.

3.14.3.2 Alternative 2 – Proposed Project

The Class 1 cultural resource searches resulted in the identification of six previously recorded sites considered eligible for the NRHP in sections along Alternative 2. These sites include the Rainbow Dam Road, the Burlington Northern-Santa Fe Railroad, one other historic railroad, a large tipi ring site, and two historic irrigation systems. There are 13 sites where NRHP-eligibility has not been determined, is unknown, or is unresolved. This group includes four tipi ring sites, two buffalo jump sites, a prehistoric site consisting of stone cairns, two historic roads or trails, a railroad, a bridge, a homestead, and an irrigation system. There is one previously recorded tipi ring site that was determined not eligible for the NRHP.

3.14.3.3 Alternative 3 – MATL B

The Class 1 cultural resource searches resulted in the identification of seven previously recorded sites considered eligible for the NRHP in sections along Alternative 3. These sites include the Rainbow Dam Road, the Burlington Northern-Santa Fe Railroad, one other historic railroad, a large tipi ring site, an historic oil refinery, and two historic irrigation systems. There are nine sites where NRHP-eligibility has not been determined, is unknown, or is unresolved. This group includes two tipi ring sites, two buffalo jump sites, a prehistoric site consisting of stone cairns, an historic bridge, a homestead, and two sites only described as historic. There are two previously recorded homestead or residence sites that were determined not eligible for the NRHP.

3.14.3.4 Alternative 4 – Agency Alternative

The Class 1 cultural resource searches resulted in the identification of three previously recorded sites considered eligible for the NRHP in sections along Alternative 4. These sites include the Rainbow Dam Road, an historic transmission line, and the Burlington Northern-Santa Fe Railroad. There are 20 sites where NRHP-eligibility has not been determined, is unknown, or is unresolved. This group includes six tipi ring sites, two lithic scatter sites, two prehistoric camp sites, an historic road or trail, five homesteads, two historic irrigation systems, one historic trash dump, and one historic mining site.

3.15 Visuals

3.15.1 Analysis Methods

Analysis Area

The visual resource analysis was developed using a resource analysis area 1 mile on either side of the proposed transmission line alternatives.

Information Sources

Visual resources refer to the natural and man-made features in the project site analysis area landscape and include cultural and historic landmarks, landforms of particular beauty or significance, water surfaces, and vegetation. Together, these features form the overall impression that a viewer receives of an area or its landscape character.

Data and information for this section were compiled and refined from a variety of sources and verified by ground reconnaissance by Montana Alberta Tie, Ltd. during July and August 2005. Additional ground reconnaissance was conducted during May 2006 by DEQ and Tetra Tech. Additionally, aerial photographs were used to validate, change, or add to existing CAMA residential location information. Some of this information was originally compiled by AMEC Earth and Environmental for the MFSA application (MATL 2006b) and confirmed for use in this analysis.

Visual environmental impacts were analyzed in part by using computer generated photographic simulations. Technical information about these photographic simulations is provided in **Appendix L**.

3.15.2 Affected Environment

Landscape Character

The Project area is located in the Northwestern Glaciated Plains ecoregion (Nesser and others 1997) and is characterized by level to gently rolling glaciated plains crossed by alluvial corridors of the Marias and Teton rivers and their tributaries. Both dryland cultivation and irrigated cropland are common throughout the Project area (Montana Environmental Quality Council 1972). This agricultural land base gives the landscape its characteristic and dominant patterns of linear strips of dryland cultivation and circular and rectangular shapes associated with irrigated fields. Field colors that change seasonally among greens, yellows, and browns accentuate these strong landscape patterns. Scattered parcels of rangeland and native grassland found in steeper coulees and rough terrain throughout the Project area provide additional color and texture in the viewed landscape.

Alluvial floodplains of the Marias and Teton rivers provide more topographic relief and diverse vegetation than surrounding uplands and plains. Mature cottonwood stands, riparian undergrowth of willows, boxelder, and chokecherry, eroded rock formations on valley walls, and meandering river channels contribute to a higher scenic quality in these floodplain corridors. In addition to these alluvial corridors and rivers, area lakes such as Benton and Hay lakes and Black Horse Lake, which is ephemeral, provide another type of water feature in the Project area. Scattered prairie potholes and wetlands dominated by trees, shrubs, emergents (cattails, bulrush), mosses, or lichens are also found in the Project area.

The cultivated and rural landscape provides the dominant cultural setting for the Project area. Rural farms and ranches dot the landscape, increasing in density where irrigation is present. Developed commercial and residential settings are found at small communities like Power, Dutton, and Brady, and the larger communities of Cut Bank and Conrad. Great Falls, at the southern edge of the Project area, is the only urban setting. Visual linear elements, including Interstate 15, state and local roads, railroads, and transmission lines crisscross the region, providing transportation and energy links for residents and commercial use. Other cultural modifications include the scattered oil and gas fields in the northern portion of the Project area and radio towers near Cut Bank and Great Falls. With the visual dominance of dryland and irrigated cultivation throughout the Project area, scenic integrity is high. Although cultural modifications and industrial development are present and visible in typical views, these modifications are typically subordinate to the predominant agricultural landscape.

Views are typically expansive throughout the entire Project area, extending across rolling uplands and plains to the Rocky Mountain Front and island ranges such as the Sweet Grass Hills and Highwood Mountains. Only in the alluvial valleys of the Teton and Marias rivers, their tributaries, and in steep coulees with some degree of topographic relief do views become more enclosed and limited.

Landscape Rating Units and Scenic Quality

The analysis area has been subdivided into landscape units for rating purposes. The rating areas (provided below) were delineated on a basis of: (1) like physiographic characteristics; (2) similar visual patterns, texture, color, variety, and other features; and (3) areas that have similar impacts from man-made modifications.

The scenic quality of each of the landscape units is provided at the end of each unit description. Scenic quality is a measure of the visual appeal of a tract of land or scenic quality rating unit. Scenic quality rating units can be assigned an A (outstanding), B (above average), or C (common) rating based on the apparent scenic quality, which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. No Class A areas are present. Those areas classified as Class B are shown on **Figures 3.15-1, 3.15-2,** and **3.15-3**.

Alluvial Corridors

This unit constitutes narrow strips of land following coulees, creeks, and major rivers crossing the visual analysis area. The unit is moderately diverse in terrain, vegetation, and water features. Corridors along coulees and creeks in the analysis area are designated as Class C. The Marias River corridor and the Teton River corridor are designated as Class B due to expansive floodplains, diverse vegetation patterns, river meanders, and topographic relief present in the setting.

Wetland Areas

Wetlands found in the visual analysis area include:

- permanently flooded lakes and reservoirs, and intermittent lakes;
- wetlands found along creek channels and coulees and in association with prairie potholes; and
- wetlands that have natural or artificial channels and periodically or continuously flowing water such as the permanently flooded river channel bottoms associated with the Marias and Teton rivers.

Figure 3.6-1 shows the location of all mapped wetlands within the MATL Project study area. Most wetlands provide diverse vegetation and have low landform diversity and are designated as Class C. The wetlands associated with the Marias and Teton rivers are designated as Class B.

Rims, Ridges, and Buttes

Several rims, ridges, and buttes occur in the Project study area. Prominent features include Lookout Butte, Abbott Ridge and Trunk Butte south of Cut Bank, West Knob and East Knob north of the Teton River in Chouteau County, Teton Ridge, and the Sun River/Missouri River Rim in the southern Project study area. These features are designated Class C because they offer less vegetation diversity than the Class B areas shown on **Figures 3.15-1**, **3.15-2**, and **3.15-3** and little visual variety.

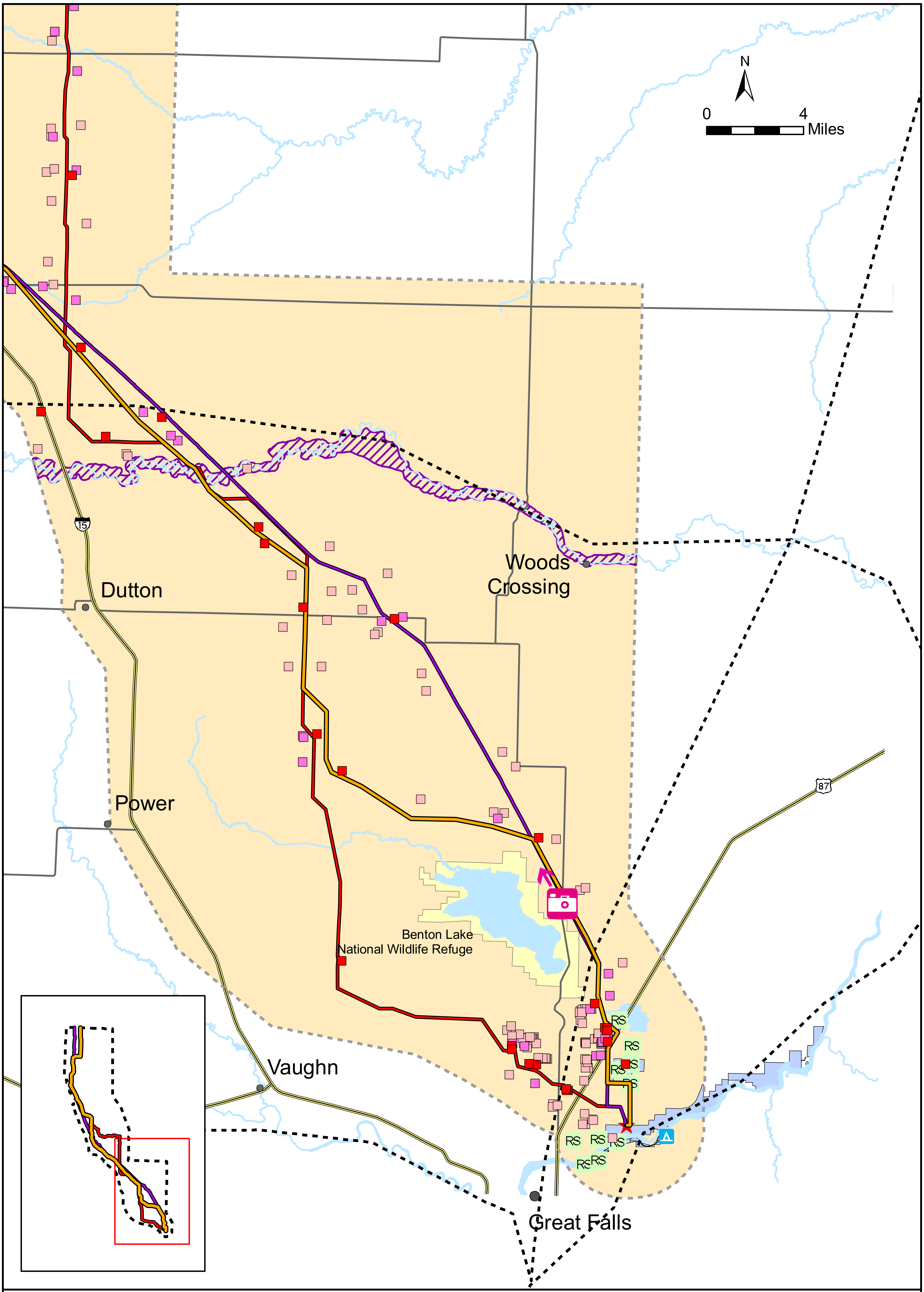

N
0
4
Miles
Woods
Crossing
Dutton
15
Power
87
Benton Lake
National Wildlife Refuge
RS
Vaughn
Great Falls

FIGURE 3.15-1 LOCATIONS OF VISUAL IMPORTANCE SOUTH

LEGEND

- 🟥 HOUSES WITHIN 1/4 MILE OF ANY ALTERNATIVE
- ■ HOUSES BETWEEN 1/4 AND 1/2 MILE OF ANY ALTERNATIVE
- ■ HOUSES BETWEEN 1/2 AND 1 MILE OF ANY ALTERNATIVE
- △ LEWIS AND CLARK CAMPSITES
- RS RECREATION SITES
- ---- LEWIS AND CLARK TRAIL
- ▣ VISUAL SIMULATION POINTS WITH CAMERA ANGLE
- ━ ALT2 - ALIGNMENT
- ━ ALT3 - ALIGNMENT
- ━ ALT4 - ALIGNMENT
- ▨ VISUAL QUALITY CLASS B AREAS
- ▭ BENTON LAKE NATIONAL WILDLIFE REFUGE
- ▭ LANDS MANAGED BY MT DEPT. FISH, WILDLIFE AND PARKS
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- ▭ STUDY AREA
- ═ MAJOR HIGHWAYS
- ─ SECONDARY ROADS
- ─ RIVERS AND STREAMS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_15-1_MATL_visual_mpacts_south_part_012007.mxd

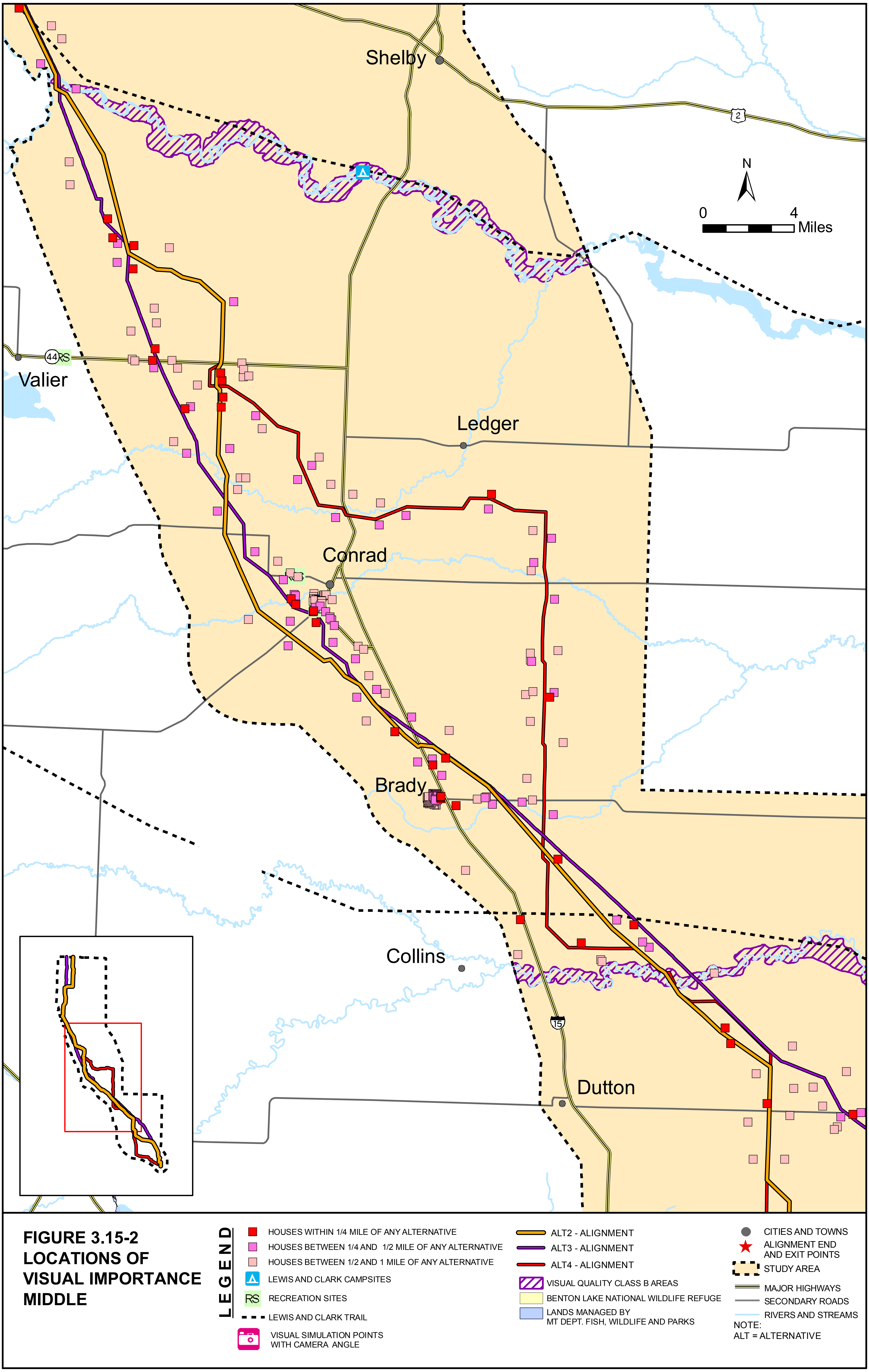

Shelby
2
N
0
4
Miles
44
RS
Valier
Ledger
Conrad
Brady
Collins
15
Dutton
LEGEND
■ HOUSES WITHIN 1/4 MILE OF ANY ALTERNATIVE
■ HOUSES BETWEEN 1/4 AND 1/2 MILE OF ANY ALTERNATIVE
■ HOUSES BETWEEN 1/2 AND 1 MILE OF ANY ALTERNATIVE
LEWIS AND CLARK CAMPSITES
RS RECREATION SITES
LEWIS AND CLARK TRAIL
VISUAL SIMULATION POINTS WITH CAMERA ANGLE
ALT2 - ALIGNMENT
ALT3 - ALIGNMENT
ALT4 - ALIGNMENT
▨ VISUAL QUALITY CLASS B AREAS
BENTON LAKE NATIONAL WILDLIFE REFUGE
LANDS MANAGED BY MT DEPT. FISH, WILDLIFE AND PARKS
● CITIES AND TOWNS
★ ALIGNMENT END AND EXIT POINTS
STUDY AREA
MAJOR HIGHWAYS
SECONDARY ROADS
RIVERS AND STREAMS
NOTE:
ALT = ALTERNATIVE

FIGURE 3.15-2
LOCATIONS OF VISUAL IMPORTANCE MIDDLE

GIS map by Ed Madej -TTEMI-HE Fig3_15-2_MATL_visual_impacts_middle_part_012007.mxd

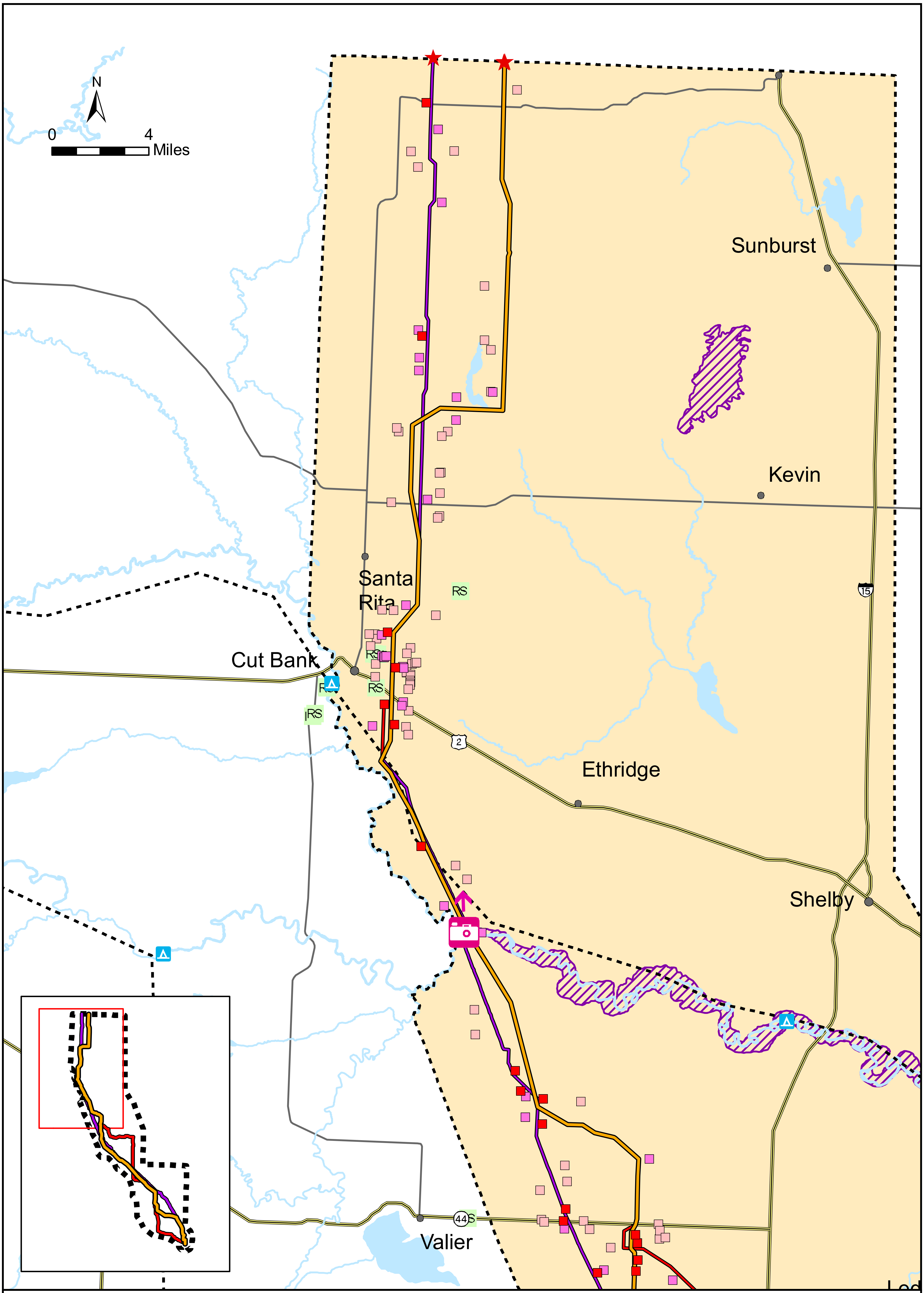

N
0
4
Miles
Sunburst
Kevin
Santa Rita
RS
Cut Bank
RS
RS
RS
2
Ethridge
15
Shelby
Valier
44
LEGEND
HOUSES WITHIN 1/4 MILE OF ANY ALTERNATIVE
HOUSES BETWEEN 1/4 AND 1/2 MILE OF ANY ALTERNATIVE
HOUSES BETWEEN 1/2 AND 1 MILE OF ANY ALTERNATIVE
LEWIS AND CLARK CAMPSITES
RS RECREATION SITES
LEWIS AND CLARK TRAIL
VISUAL SIMULATION POINTS WITH CAMERA ANGLE
ALT2 - ALIGNMENT
ALT3 - ALIGNMENT
ALT4 - ALIGNMENT
VISUAL QUALITY CLASS B AREAS
BENTON LAKE NATIONAL WILDLIFE REFUGE
LANDS MANAGED BY MT DEPT. FISH, WILDLIFE AND PARKS
CITIES AND TOWNS
ALIGNMENT END AND EXIT POINTS
STUDY AREA
MAJOR HIGHWAYS
SECONDARY ROADS
RIVERS AND STREAMS
NOTE:
ALT = ALTERNATIVE

FIGURE 3.15-3
LOCATIONS OF VISUAL IMPORTANCE NORTH

GIS map by Ed Madej -TTEMI-HE Fig3_15-3_MATL_visual-impacts_north_part_012007.mxd

Uplands and benchlands

Uplands and benchlands comprise the majority of the Project study area. Benchlands are characterized by gently sloping terrain, expansive views, and irrigated cropland use. They occur predominantly in the center of the Project study area between the Marias River and Pondera Coulee. The remainder of the Project study area constitutes rolling uplands with a fairly uniform landscape of gently sloping wheat fields and grassland. These landscapes are designated Class C.

Existing Inventories

Federal and state land managers and local/county officials have not developed maps that establish an inventory of scenic attractiveness, distance zones or concern levels, scenic classes, and visual absorption capability for any portion of the Project study area.

Travel Routes

Travel routes include the primary and secondary roads shown in **Figures 3.15-1**, **3.15-2**, and **3.15-3**.

3.15.3 Environmental Impacts

Distance Zones and Visual Influence Zones

Distance zones were established based on thresholds for visual perception of form, texture, color, and line. These visual criteria change as distance from a viewpoint increases. Detailed elements on the landscape tend to become less obvious and detailed at longer viewing distances. Elements of form and line become more dominant than color and texture at longer viewing distances. Four distance zones were established:

- Immediate Foreground (0 to 0.25 mile) — The immediate foreground is the dominant view threshold. Details are easily perceived and obvious. Changes may dominate the landscape.
- Foreground (0.25 to 0.5 mile) — The foreground is the viewed area in which details are perceived and obvious, though less so than the immediate foreground.
- Middleground (0.5 to 1 mile) — The middleground is the zone where details of foliage and fine textures are less perceptible. Vegetation begins to appear as patterns. Form and line are more dominant visual elements.
- Background (1 to 3 miles) — The background is the portion of the landscape where texture is weak and landform becomes the most dominant element.

Impact Types and Levels

Most visual impacts are direct and long term. The major impact concern assessed by the visual resources study is the potential for a decline in aesthetic quality. Visual impact types evaluated include the following:

- Effects on scenic quality
- Effects on views from residential, commercial, institutional, and other visually sensitive land uses (existing and planned)
- Effects on views from travel routes
- Effects on views from established, designated or planned park or recreation areas
- Visual contrast resulting from different structure types and/or materials, and construction of new access trails

Determination of potential impacts and levels was based on assessing: 1) physical contrasts or landscape changes that would result from the project and 2) the degree of visibility that the project would have from each sensitive land use or scenic area (key observation points). Visibility levels for key observation points were determined by assessing viewer sensitivity, distance from the proposed project, and duration of views. The impact levels for areas with a current non urban area land use are described below. **Table 3.15-1** provides a summary of the impact levels for various observation points.

> **Major Impact** – A high level of impact would result if the construction and operation of the transmission line would potentially cause substantial adverse change to viewers at residential and designated recreation sites or result in substantial and noticeable landscape alteration in areas of above average or outstanding visual quality. Generally, structures within the immediate foreground and foreground (½ mile) of residences, immediate foreground of recreation sites, or within areas of Class B scenic quality would result in a major impact. Structures within the immediate foreground or foreground of primary use travel corridors would result in a major impact.
>
> **Minor Impact** – A minor level of impact would result if the construction and operation of the transmission line would potentially result in a noticeable landscape alteration in areas of average visual quality to viewers at residences, designated recreation sites (including the Lewis and Clark trail corridor), or along travel corridors. Generally, structures within the foreground (¼ to ½ miles) of recreation sites and within the middleground (½ to 1 mile) of residences would result in a minor impact. Structures within the middleground of primary use travel corridors would result in a minor impact.

Very Minor Impact – A very minor impact is the result of a small degree landscape alteration in areas of average or common visual quality. Views of the transmission line within the middleground and background of recreation sites, within the background of primary use travel corridors, within the background of residences, or within middleground and background of secondary use travel corridors would result in a very minor impact.

Residences, recreation sites, travel corridors, and areas with Class B scenic quality within 1 mile of Alternatives 2 through 4 are shown in **Figures 3.15-1** through **3.15-3**. The remainder of the natural landscape in the Project study area – including uplands, benchlands, rims, ridges, buttes, and wetlands – has generally lower landscape and viewer sensitivity.

TABLE 3.15-1
VISUAL IMPACT LEVELS FROM VARIOUS OBSERVATION POINTS[a]

Observation Points[a]	Immediate Foreground (0 – ¼ mile)	Foreground (¼– ½ mile)	Middleground (½ - 1 mile)	Background (> 1 mile)
Residential	Major	Major	Minor	Very Minor
Recreation	Major	Minor	Very Minor	Very Minor
Travel – Primary Roads	Major	Major	Minor	Very Minor
Travel – Secondary Roads	Minor	Minor	Very Minor	Very Minor

Notes:
[a] A transmission line going through a Class B scenic quality area would be a major impact.

3.15.3.1 Alternative 1 – No Action

There would be no additional visual impacts under the No Action alternative.

3.15.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Information on the visual impacts from various observation points is provided in **Table 3.15-2**. The number of area residences, recreational sites, and class B scenic areas that fall within the immediate foreground, foreground, and middleground of each alternative centerline is provided in this table. In addition, the miles of major highways that fall within the immediate foreground, foreground, and middleground of each alternative centerline are provided. **Figures 3.15-1, 3.15-2**, and **3.15-3** provide a visual overview of the data provided in **Table 3.15-2**.

TABLE 3.15-2
COMPARISON OF DISTANCE ZONES FROM VARIOUS OBSERVATION POINTS[a]
Action Alternatives 2, 3, and 4

Alternative	**Number of Residences (Points)**			**Recreation – General[b] (Point)**			**Recreation - L & C Trail (Lineal Mileage)**			**Travel Corridor[c] (Lineal Mileage)**		
Miles	0 to 1/4	1/4 to 1/2	1/2 to 1	0 to 1/4	1/4 to ½	1/2 to 1	0 to 1/4	1/4 to 1/2	1/2 to 1	0 to 1/4	1/4 to 1/2	1/2 to 1
Alternative 2	30	60	91	1	2	NA[d]	7.94	3.39	NA	3.3	2.8	6.3
Alternative 3	34	71	124	0	3	NA	7.72	2.3	NA	3.7	3.9	8.2
Alternative 4	20	45	111	0	0	NA	6.51	2.85	NA	2.7	2.3	5.3

Notes:

[a] All action alternatives would cross the Marias River and Teton River, which are Class B scenic areas.

[b] Does not include the conservation easement located north of the Missouri River at Great Falls switch yard (Lewis and Clark Greenway Conservation Easement).

[c] Interstate 15 and U.S. Highways 2 and 87

[d] NA = Not available

Residential Areas – Long Term

Residences are located within the immediate foreground and foreground of the centerline of each action alternative. As **Table 3.15-2** indicates, Alternative 4 would have the least number of residences (65) within ½ mile. Alternative 2 would have the second least (90). Alternative 3 would have the highest number of residences within ½ miles (105). As a result, the overall long-term impact for residences that would be classified as a major impact would be the highest for Alternative 3 and the lowest for Alternative 4. The long-term impact for residences that would be classified as minor (within ½ to 1 mile of an alternative centerline) would be highest for Alternative 3 (124 residences) and lowest for Alternative 2 (91 residences). No residential clusters, including Hutterite colonies, are located within the immediate foreground or foreground of any of the alternatives. One Hutterite colony is located within one mile of Alternative 2.

Recreation Areas – Long Term

All three action alternatives would cross the Lewis and Clark National Historic Trail and the Teton and Marias river corridors. All action alternatives would also be within the foreground of the Missouri River Corridor and several developed recreation areas near Great Falls including Giant Springs State Park, the Lewis and Clark Interpretive Center, and the Lewis and Clark Heritage Greenway. Alternative 2 crosses to the south and west of the Great Falls Shooting Sports Complex located north of Great Falls; Alternative 3 crosses to the west of the complex. Both Alternatives 2 and 3 cross within the foreground of Benton Lake National Wildlife Refuge. Other recreation areas considered, but not within the foreground, include wildlife production areas, research natural areas, and other sporting venues/complexes (for example, golf courses, race tracks, rodeo arenas, city parks) located along alignment alternatives near Cut Bank, Conrad, and Great Falls. Although many recreational areas in the Great Falls area would be within the foreground of the proposed transmission line, the proposed transmission line would be an additional line in a setting with many transmission lines and a substation. The visual effect of an additional line would be incremental.

As shown in **Table 3.15-2**, Alternative 4 would not have any recreational sites within ½ mile of the alignment. Alternatives 2 and 3 would each have three recreation sites within ½ mile; however, one site (Morony entrance to the Great Falls Shooting Sports Complex) would be less than ¼ mile from Alternative 2 only. A recreational site within ¼ mile is classified as a major impact.

Travel Routes – Long Term

Major travel routes that were considered include: Interstate 15 and U.S. Highways 2 and 87. Each of these highways would be crossed by each action alternative. The action alternatives differ slightly in the lineal miles of proposed alignment that would be within ½ mile of these major travel routes. Alternative 2 would have 11.3 miles within ½ mile, Alternative 3 would also have 11.3 miles within ½ mile, and Alternative 4 would have 9.4 miles (**Table 3.15-2)**. A transmission line within ½ mile of a major travel route is classified as a major impact.

Two computer generated visual simulations were developed showing the proposed line looking northwest from Montana State Highway 44, also known as Bootlegger Trail (see location map **Figure 3.15-4**). Though not a high volume road (major travel route), this viewpoint on Bootlegger Trail is typical of views from secondary roads. One view incorporates an H-frame power line (**Figure 3.15-5**), and one view incorporates a monopole power line with a typical structure height of 68 to 86 feet and a ruling span of 475 feet (**Figure 3.15-6**). MATL is also considering use of monopole structures that would have a typical height of 85 to 99 feet and a ruling span of 790 feet. While the span length of the taller monopoles would more closely approximate that of H-frame structures, their increased height would make them more visible.

Visual impacts on all major travel routes would be comparable for all action alternatives with major impact levels for the immediate foreground and foreground viewing areas. The MATL 230-kV transmission line would cross secondary roads seven times under Alternative 2, seven times under Alternative 3, and six times under Alternative 4. Visual impacts on all secondary road crossings would be minor.

Landscape Alteration – Long Term

The visual contrast of the proposed transmission line would be based on varying levels of potential landform and vegetation alteration that would result from construction. Landform contrast would result where access roads and pads for structure erection are constructed in hilly or steep terrain. Hillside benching, exposure of subsoil, and erosion scars from project construction in steeper terrain could modify existing topography and soils, resulting in visual contrast that is long term. These effects are more likely to occur on steeper slopes near the crossings of the Marias and Teton rivers, compared to surrounding uplands and plains. However, the transmission line structures would be located so that no roads need to be constructed over the edge of cliffs along the Marias and Teton rivers. **Figure 3.15-7** shows a computer generated visual analyses of an H-frame power line crossing the Marias River. Based on the crossing of rivers corridors with Class B scenic quality, the potential impact for all action alternatives would be major.

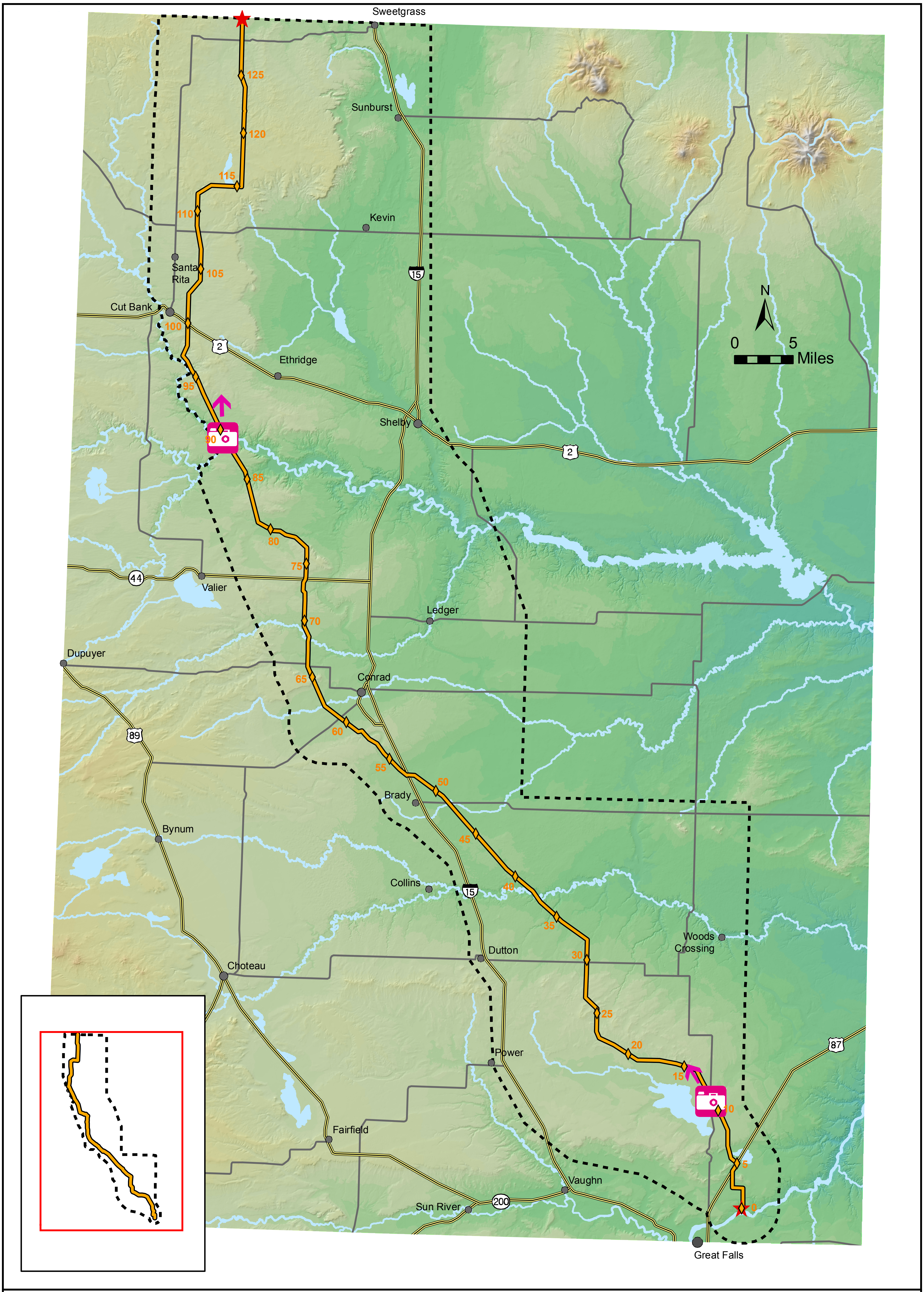

Sweetgrass
Sunburst
Kevin
Santa Rita
Cut Bank
Ethridge
Shelby
Valier
Ledger
Dupuyer
Conrad
Brady
Bynum
Collins
Dutton
Woods Crossing
Choteau
Power
Fairfield
Vaughn
Sun River
Great Falls
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
2
15
44
89
87
200
N
0 5 Miles

FIGURE 3.15-4
VISUAL SIMULATION LOCATIONS

LEGEND

ALTERNATIVE 2 - ALIGNMENT

◆ MILEPOSTS

VISUAL SIMULATION POINTS WITH CAMERA ANGLE

NOTE:
ALT = ALTERNATIVE

● CITIES AND TOWNS

★ ALIGNMENT END AND EXIT POINTS

STUDY AREA BOUNDARY

MAJOR HIGHWAYS

SECONDARY ROADS

RIVERS AND STREAMS

GIS map by Ed Madej -TTEMI-HE Fig3_15-4_MATL_Visual_Simulation_Locations_012007.mxd

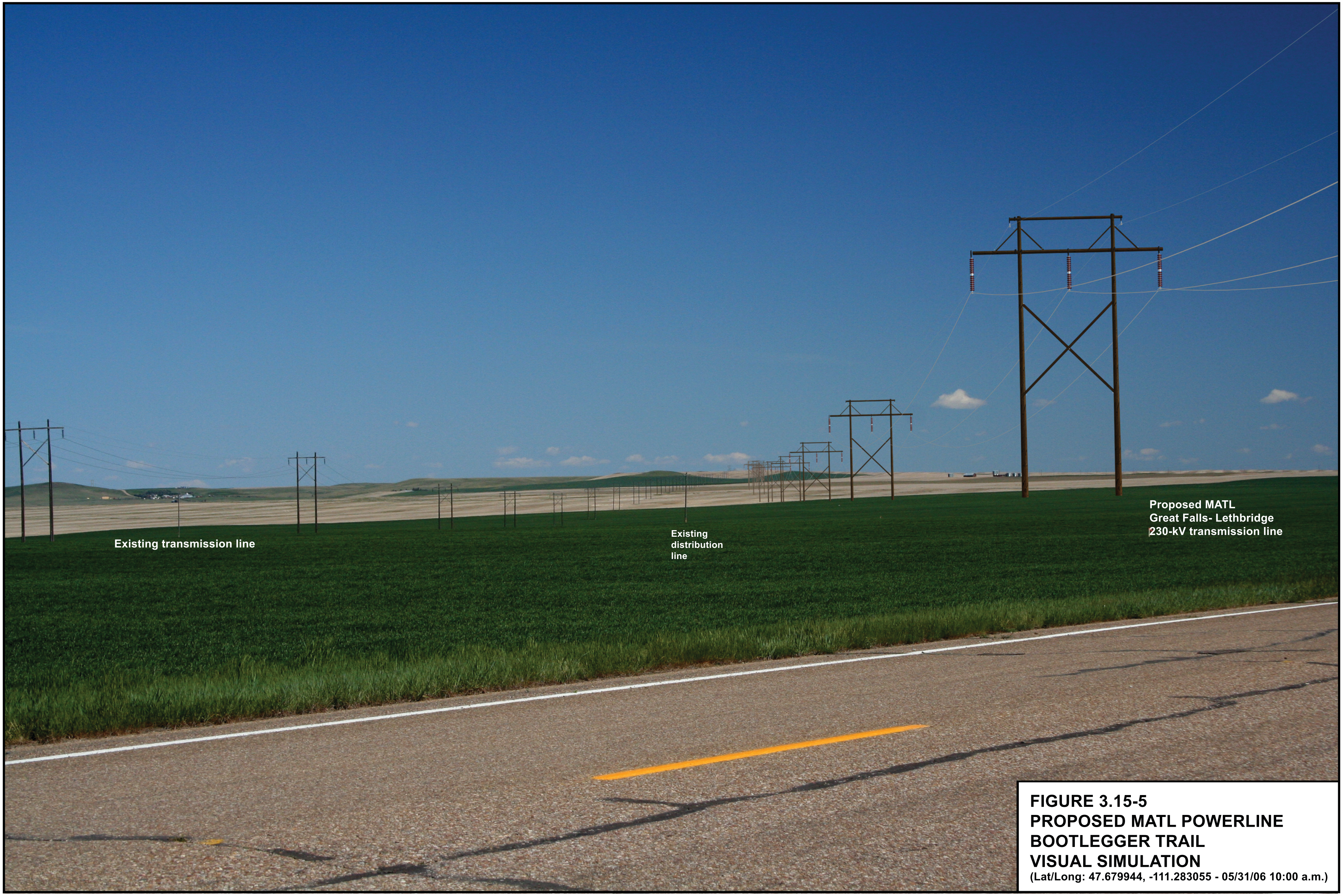

Existing transmission line
Existing distribution line
Proposed MATL Great Falls- Lethbridge 230-kV transmission line

FIGURE 3.15-5
PROPOSED MATL POWERLINE
BOOTLEGGER TRAIL
VISUAL SIMULATION
(Lat/Long: 47.679944, -111.283055 - 05/31/06 10:00 a.m.)

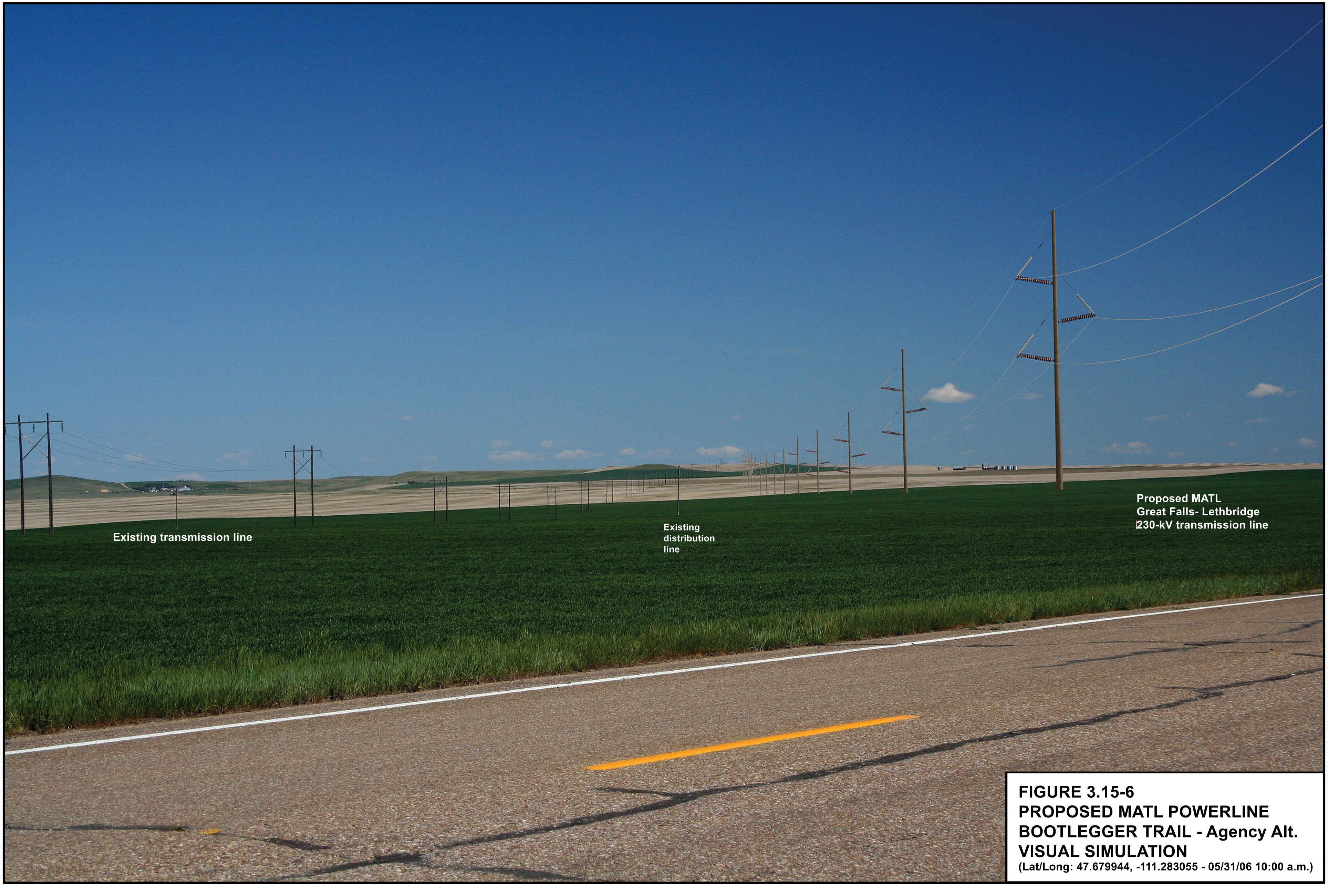

Existing transmission line
Existing distribution line
Proposed MATL Great Falls- Lethbridge 230-kV transmission line

FIGURE 3.15-6
PROPOSED MATL POWERLINE
BOOTLEGGER TRAIL - Agency Alt.
VISUAL SIMULATION
(Lat/Long: 47.679944, -111.283055 - 05/31/06 10:00 a.m.)

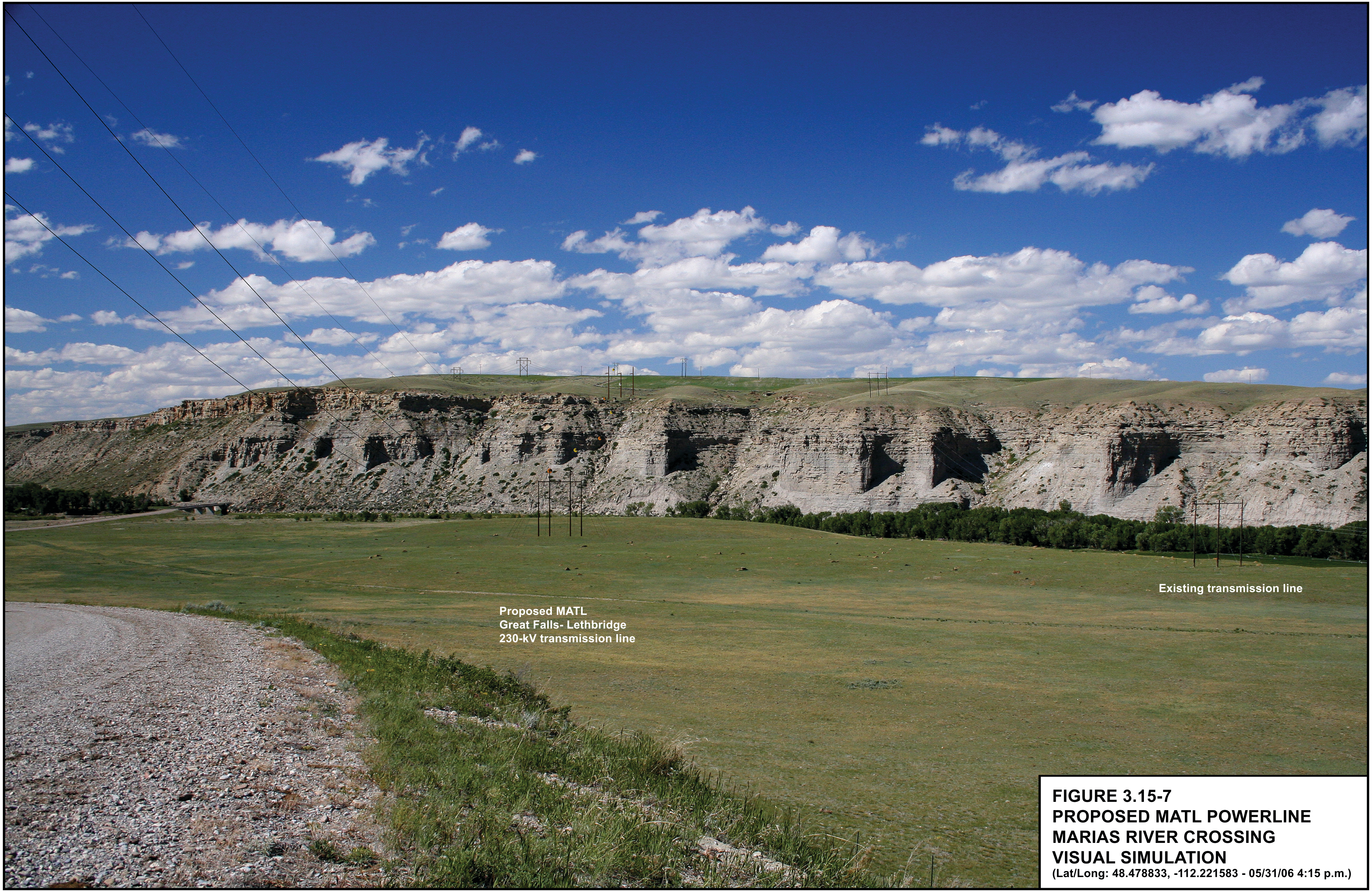

Proposed MATL
Great Falls- Lethbridge
230-kV transmission line
Existing transmission line

FIGURE 3.15-7
PROPOSED MATL POWERLINE
MARIAS RIVER CROSSING
VISUAL SIMULATION
(Lat/Long: 48.478833, -112.221583 - 05/31/06 4:15 p.m.)

Successful implementation of reclamation and revegetation efforts and the avoidance of dense riparian vegetation at the proposed river crossing would decrease the impact to minor levels.

Vegetation contrast is a function of existing cover type (riparian forest, grassland, or agricultural cropland) and the amount of clearing needed for line construction and maintenance. Higher levels of vegetation contrast would result where woody riparian growth is removed from the right of way, structure sites, and access roads. This effect can be long term where mature trees, windbreaks, and other woody vegetation are trimmed or removed for line operation over the life of the project.

Visual Impacts — Short Term

In agricultural cropland, vegetation would be removed for one growing season as structures are erected and construction traffic uses access roads. This effect would likely be short term for all action alternatives as crops would be restored in the following year.

Visual Resource Mitigations

To minimize adverse environmental impacts to visual resources from Alternative 2 and address local visuals issues in specific places, DEQ identified several potential mitigation realignments that are described by segments A1, A2, B1, B2, C1, C2, D, and E in **Appendix A.** The realignments that would mitigate visual impacts on a local scale are:

- Segment D - Belgian Hill Realignment
- Segment E - South of Cut Bank Realignment

A description of these realignment segments and the agency's preliminary analysis of their environmental impacts are presented in **Appendix A**.

3.16 Electrical Transmission System Operation and Reliability

This section describes the affected transmission system as it is currently configured and managed, and how reliability could be affected by the Project. This analysis was based, in part, on the results of a system feasibility study (ABB Consulting 2005) and the NorthWestern Energy MATL System Impact Study (Appendix I to the MATL application). Additional data and information for this section were compiled and refined from several sources including the MATL application for certification (MATL 2006b) and information contributed by DEQ economist (Blend 2007).

Prior to issuing a Presidential permit, DOE will prepare a separate reliability determination. At the time this document is published, information on which to base the DOE decision is preliminary.

3.16.1 Existing Transmission System

The North American transmission grid moves electricity from power-generating facilities to customers using a transmission system coordinated by the North American Electric Reliability Council (**Figure 1.1-2**). NERC's mission is to ensure that the bulk electric system in North America is reliable, adequate, and secure. NERC's primary role is to set standards for the reliable operation of the bulk electric system and monitor and enforce compliance with reliability standards (NERC 2007). NERC is composed of eight regional reliability councils formed in response to national concern regarding the reliability of the interconnected bulk power systems, the ability to operate these systems without widespread failures in electric service, and the need to foster the preservation of reliability through a formal organization (NERC 2007).

Montana is located primarily within the western grid under the authority of the Western Electricity Coordinating Council (WECC). The WECC region is the largest and most diverse of the regional councils. WECC's service territory extends from Canada to Mexico and includes the provinces of Alberta and British Columbia, the northern portion of Baja California, Mexico, and all or portions of the 14 western states in between (**Figure 1.1-2**). The WECC mission is to support efficient competitive power markets, assure open and non-discriminatory transmission access among members, and provide a forum for resolving transmission access disputes (WECC 2007). There is currently no direct power transmission connection between Alberta and Montana (**Figure 1.1-2**).

Transmission Capacity

Owners of transmission lines sell rights to use lines on a long-term firm basis, a long-term non-firm basis, or a short-term basis. "Firm" transmission service is a contractually established priority right to transmit a given amount of energy for a given period of time. "Non-firm" service is typically reserved and scheduled on an as-available basis and is subject to curtailment or interruption. An agreement must be in place between a shipper and an owner of a line before any power can be transmitted over the western grid. Under WECC requirements, the owner of a line must determine whether the line has available capacity before an agreement can be entered into. The available transmission capacity is calculated by subtracting contracted uses from the total rated line flow capacity. The transmission path can be described as congested if (1) no rights to use it are for sale, (2) it is fully scheduled and no firm space is available, or (3) the path is fully loaded to its flow capacity (DEQ 2004).

Electricity moving across the western grid does not necessarily follow contracted paths. Rather it flows along the paths of least resistance. Therefore, before a new transmission line is added to a grid, operators of the grid conduct studies to ensure that new power does not overload other lines and substations on the grid. In the case of the proposed MATL line, these studies are overseen by WECC.

Montana's Electricity Generation and Transmission System

Except for several rural electric cooperatives and Montana Dakota Utilities customers, Montana's residential and commercial customers receive most of their contracted electricity from generation facilities located in Montana (DEQ 2004).

Most of Montana's electric generation is owned by private utilities or by the federal government through the U.S. Army Corps of Engineers or the Bureau of Reclamation. The Bonneville Power Administration (BPA) and WAPA market hydropower from federal dams in Montana. PPL Montana is the largest supplier of Montana-consumed energy, owning both hydroelectric and coal-fired generation. PPL Montana's hydroelectric generation facilities are regulated by the Federal Energy Regulatory Commission (FERC).

Montana has just over 5,000 MW of electrical generation capacity within its borders, most of it coal-fired and hydroelectric power. From 1999 to 2003, Montana's electric generating plants produced an average output of about 3,000 average megawatts (aMW) (DEQ 2004). During that same time period, just over half of Montana generation was consumed in-state, while approximately 1,400 aMW were delivered out of the state (DEQ 2004).

Wholesale prices of electricity are set by contract negotiations between transmission suppliers and electricity suppliers. Wholesale prices in Montana are usually bounded by prices at the Mid-Columbia hub located near the Columbia River in Washington State. Usually, the wholesale price for electricity goes no higher than the Mid-Columbia price minus transmission costs into Montana (Blend 2007). NWE is the only major Montana transmission utility in-state on the Western Grid and is responsible for determining the default power supply for consumers in Montana. The default source must be approved by the Public Service Commission (Blend 2007).

NWE, Montana's largest private transmission and distribution utility, uses around 600 to 650 aMW of electricity to serve its customers, with a peak usage of over 1,000 MW. BPA and WAPA provide transmission service to electric cooperatives that deliver electricity to many of the smaller Montana customers on the western grid not served by NWE. Other wholesale suppliers provide electricity over transmission lines owned by NWE to a number of large commercial and industrial customers. NWE is regulated by the Montana Public Service Commission, FERC, and WECC rules, while BPA and WAPA and electric cooperatives must meet federal regulatory and WECC requirements.

Alberta's Electricity Generation and Transmission System

Alberta has experienced the fastest growing electricity demand in Canada over the past 5 years (Independent Power Producers Society of Alberta 2006). Since 1999, the demand for power in Alberta has grown by 21 percent, which compares to the average growth of demand in North America of 12 percent over the same time period (Independent Power Producers Society of Alberta 2006). To meet this demand, approximately 3,800 MW of new generation have been added to Alberta's grid in the past 7 years (Independent Power Producers Society of Alberta 2006). This includes new coal units (450 MW), new wind and alternative fuel projects (300 MW), and 3,000 MW of new gas-fired generation. At present, Alberta has 11,557 MW of supply capacity, compared with almost 9,600 MW of peak demand (Alberta Department of Energy 2006). An additional 4,800 MW of power generation has been announced by industry for future development in Alberta (Alberta Department of Energy 2006).

Coal-fired generation makes up just over 50 percent of Alberta's generating capacity and gas almost 40 percent, with hydro, wind, and alternative fuel making up the remaining 10 percent (Alberta Department of Energy 2006).

The electric transmission system in Alberta is owned, built, and maintained by private investors (Alberta Department of Energy 2006), except for some municipally owned utilities. Alberta has nearly 30 suppliers offering new electricity products and services to Alberta's wholesale, commercial, and residential customers. Alberta also has electric cooperatives. Wholesale prices are set by the laws of supply and demand in Alberta and fluctuate daily in response to consumer demand (Alberta Government Services

2006). Alberta's hourly wholesale electricity market is managed by the Alberta Electric System Operator (AESO), an independent system operator that facilitates Alberta's competitive wholesale electricity market and is accountable for the administration and regulation of load settlement function (AESO 2007). Consumers may choose their own electricity supplier or remain under default supply arrangements determined by AESO, which are periodically adjusted to reflect actual wholesale power costs (Alberta Government Services 2006). The costs and expansion plans of Alberta's transmission and distribution lines are regulated by the Alberta Energy and Utilities Board.

Alberta has been a net importer of electricity 5 out of the last 6 years, but electricity regularly flows in and out of the province (Alberta Department of Energy 2006). Alberta is not currently directly connected to Montana but has 800 MW of transmission connections with British Columbia and 150 MW with Saskatchewan (**Figure 1.1-2**).

3.16.2 System Reliability Constraints and Influences

Power transmission systems must include many sources of generation and pathways to be reliable sources of electricity. The MATL transmission line may improve reliability on Montana's transmission system due to (1) better generation resource sharing and (2) different electric routing options. Different transmission system operators (jurisdictions) have different load factors and different mixes of generation. One example of this is peak loads occurring at different times of the day or seasons of the year for different jurisdictions. The fact that every jurisdiction does not experience peak demand and supply at exactly the same time of day/month allows the potential sharing of resources, which could lead to improved reliability (Williams 2006). Tie lines such as MATL can respond to these different load and generation characteristics.

A stand alone jurisdiction would need more generators standing by on an as-needed basis to cover planned and unplanned outages of generating units, than would be required for the same level of reliability if that jurisdiction was interconnected to other jurisdictions. The probability that multiple adjacent jurisdictions would experience a large loss of generation at the same time is very low, so adjacent jurisdictions can get the benefits of higher generation reliability by sharing generation resources. Sharing these resources costs each jurisdiction less than what it would cost to own the resource entirely and not share (Williams 2006).

Potential Impacts to System Reliability

Potential impacts to system reliability from the Project and alternatives are under evaluation by the NERC and will be disclosed in a report in early 2007. If NERC determines that the proposed MATL line would adversely impact system reliability outside the tolerance levels of NWE and the WECC performance criteria, the Project would not go forward. Similarly, if the costs to mitigate system reliability concerns are too high, the Project would not go forward. Preliminary findings regarding system reliability are provided below.

Potential Impacts to Reliability Based on Information Provided by MATL

The MATL tie line would potentially serve three jurisdictions: NWE, WAPA, and AESO. MATL would potentially enable the sharing of generation resources located in these jurisdictions, thereby providing a level of reliability that no one jurisdiction could afford if that jurisdiction had to cover the full cost of all of the same generators entirely on its own.

MATL might also allow more alternative options for power routing within Montana. If a particular line was removed from service due to either an unexpected event or scheduled maintenance, the MATL tie line could be used to supply power from the north giving transmission operators in Montana one more option to use in case of a removed line. This routing would depend upon loading on the line. Alberta's independent system operators might be able to use MATL in a similar fashion for their service area.

Several studies specific to the MATL project have been prepared to address impacts to transmission system reliability. No general conclusions can be made at this time regarding the Montana stability performance or performance on the rest of the western grid based on this single case study (ABB Consulting 2005). Results of the WECC study should answer these questions.

Potential Impacts to Reliability Based on Information Provided by NWE

A system impact study by NorthWestern Energy (NWE 2005) provides the following conclusions:

- No stability problems were found associated with just connecting the MATL 230-kV line to the Great Falls 230-kV switch yard.
- The addition of the MATL project to all appropriate generation interconnection projects with prior claims to NWE's system capacity under normal conditions did not cause any problems to the transmission system.
- Certain mitigation measures would be necessary to move power out of the Great Falls switch yard under conditions in which the largest line in a transmission path is out of commission or under higher outage conditions. The interconnection of the MATL line and the other generation interconnection projects to NWE's transmission system could result in curtailment of all, or a portion, of the energy flow at the switch yard during outages on the transmission system. NWE's transmission system would need improvements prior to delivering the full output at all times of this project in conjunction with the full output of other senior projects.

- Power delivered can do useful work only when current and voltage are perfectly in phase with each other. Flows greater than 150 MW on the line would require voltage additions at Cut Bank to compensate for line losses, such as those due to heat. There were no other overloads on the existing Montana system in the cases studied. As new generation at Judith Gap and Great Falls were added in the simulation, overloads began to occur on the Montana system for transmission outages in the Great Falls area. Any new generation, such as additional wind farms that would supply electricity to the MATL line, would make conditions worse. The overload conditions could be mitigated by reducing MATL flows when an outage occurs. New transmission additions in Montana would be required as MATL and new generation were added (ABB Consulting 2005).

- The results from simulation studies completed to date specific to the MATL project suggest that electric transmission system improvements would be required to provide a reliable connection of the MATL tie line under normal system conditions. In addition, the system could need mitigation measures for outage conditions in which other large lines would be out of commission. This mitigation would be identified in the WECC Three Phase Rating study. It is unclear who would pay for those mitigation measures. To the extent that Montana consumers do, that would be a cost to Montanans of the MATL line.

3.17 Draft Findings for Certification Approval

DEQ will approve a transmission line facility as proposed or as modified or an alternative to the proposed facility if it finds and determines:

- the need for the facility;
- the nature of probable environmental impacts;
- that the facility minimizes adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives;
- what part, if any, would be located underground;
- that the location of the proposed facility conforms to applicable state and local laws;
- that the facility will serve the public interest, convenience, and necessity;
- that DEQ has issued all necessary decisions, opinions, orders, certifications, and permits; and
- that the use of public lands for location of the facility was evaluated, and public lands were selected whenever their use is as economically practicable as the use of private lands (75-20-301[1], MCA).

The information supporting these determinations is summarized in this section.

3.17.1 Need

The Project is needed to provide transmission capacity between Lethbridge and Great Falls. Additional capacity would allow increased electricity trading between Alberta and Montana and could facilitate development of wind farms in the northern part of the study area.

3.17.2 Nature of Probable Environmental Impacts

Probable impacts to land use, geology, soils, safety, hazardous material management, electric and magnetic fields, water, wetlands, vegetation, wildlife, fish, special status species, air quality, noise, socio-economics, paleontological resources, cultural resources, transportation, utilities, visual resources, and the existing transmission system from the proposed Project and alternatives are described in Sections 3.1 through 3.15 and summarized in **Table 3.17-1**. This table summarizes impacts from Alternative 2 as proposed by the applicant. It does not include mitigation measures (such as potential alignment changes described for the land use and visuals mitigation discussions in Chapter 3 that may or may not be applied to Alternative 2 if selected as the preferred alternative. No natural resource would experience a substantial impact from implementation of any action alternative.

TABLE 3.17-1
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS AND COSTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Summary of Impacts**
Land Use – General Impacts	Potential impacts compared to other alternatives depend on length of alignment in general, and length on cropland.	Potential impacts compared to other alternatives depend on length of alignment in general, and length on cropland.	Potential impact compared to other alternatives depend on length of alignment in general, and length on cropland.	Loss of production due to structures & roads, increased risk of weed introduction and spread, risk of equipment damage from hitting a structure, increased time to farm around poles, and some GPS-guided equipment may be affected. Cropland crossings also increase the risk of crop duster accidents.
Land Use – General Impacts	Similar for all alternatives	Similar for all alternatives	Similar for all alternatives	During construction, facility construction traffic may conflict with movement of farm equipment on roads.
Land Use- Total Amount of Land Crossed	129.9 miles	121.6 miles	139.6 miles	Alt 3 would disturb the least amount of land. Alt 4 would disturb the most.
Land Use – Total Cropland crossed	92.7 miles	97.7 miles	87.9 miles	Alt 4 crosses the least cropland. Alt 3 crosses the most cropland.
Land Use – Total Cropland Crossed Diagonally	52.9 miles	70.4 miles	27.1 miles	Alt 4 crosses the least cropland diagonally / Alt 3 crosses the most diagonally.
Land Use – Guaranteed Use of Monopoles On Cropland	No	No	Yes	Alt 4 requires the use of monopoles for crossing all cropland, Alts 2 and 3 would use monopoles at the discretion of MATL.
Land Use –Special Management Areas Crossed	11.2 miles	6.4 miles	11.2 miles	Alt 3 would cross the least amount of special management areas. Alt 4 would avoid the Great Falls Shooting Sports Complex
Land Use – Conservation Easements Crossed	23.6 miles	18.1 miles	32.5 miles	Alt 3 would cross the least amount of conservation easements. Alt 4 would cross the most.
Land Use – Proximity to Residences	1 residential development within 100 feet of alignment	4 residential developments within 100 feet.	1 residential development within 100 feet of alignment.	Alts 2 and 4 have the fewest residential developments close to the alignment.

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Land Use – Length of 500-foot-wide Alignment Buffer Zone Within 100 feet of a Pipeline.	7.0 miles	23.7 miles	5.7 miles	Alt 4 has the least amount of the 500-foot alignment buffer zone near pipelines. Alt 3 contains the greatest length of alignment near pipelines.
Land Use – Impacts to Roads and Road Use	Increased traffic on roads during construction resulting in occasional conflicts with farm machinery.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Geology – Miles on Soil and Geologic Resources Prone to Mass Movement	9 miles	3 miles	20 miles	Alt 3 would have the least risk of causing mass movement that could result in pole instability. Alt 4 presents the greatest risk.
Soils – Miles on Unstable Soils	10 miles	12 miles	24 miles	Alt 2 would have the least risk of soil erosion. Alt 4 presents the greatest risk. Soil erosion impacts can be mitigated under all alternatives.
Engineering	No adverse impact to structural reliability is anticipated.	Same as Alt 2	Same as Alt 2	All facilities are proposed to be constructed in compliance with accepted engineering standards.
Hazardous Materials	No impact to resources from hazardous materials is anticipated.	Same as Alt 2	Same as Alt 2	MATL proposes to manage and transport hazardous materials and wastes in accordance with State and federal requirements.
EMF – Exposure Levels	No impact	Same as Alt 2	Same as Alt 2	Exposure levels would not exceed state standards for electric fields.
EMF – Radio or TV Interference	No impact	Same as Alt 2	Same as Alt 2	No alternative is expected to interfere with radio or TV reception.

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Water – General Impacts	Potential impact compared to other alternatives depends on number of river crossings	Potential impact compared to other alternatives depends on number of river crossings	Potential impact compared to other alternatives depends on number of river crossings	Minor short-term adverse impacts to surface water quality could occur by temporarily increasing sources of sediment from the time of construction to reclamation completion. This impact would be mitigated if water and riparian areas are undisturbed or measures to reduce sediment transport are installed.
Water – Potential Number of Perennial Stream or River Crossings	10	6	17	Alt 3 poses the lowest risk and Alt 4 poses the highest risk of contributing sediment to streams based on number of stream crossings.
Water – Potential Number of Lake Crossings	4	6	2	
Wetlands - General	Potential impact compared to other alternatives depends on acres of crossed wetlands	Potential impact compared to other alternatives depends on acres of crossed wetlands	Potential impact compared to other alternatives depends on acres of crossed wetlands	Construction disturbance could result in a change in wetland plant community if wetland hydrology is altered. This impact would not occur if wetlands were undisturbed during construction and maintenance.
Wetlands – Total Wetlands and Potential Wetlands Crossed	67.6 acres	62.3 acres	76.4 acres	Alt 3 crosses the least amount of ground that contains wetlands and potential wetlands. Alt 4 crosses the greatest amount of wetlands and potential wetlands.
Vegetation - General	Potential impact compared to other alternatives is dependent on acres of disturbed native vegetation	Potential impact compared to other alternatives is dependent on acres of disturbed native vegetation	Potential impact compared to other alternatives is dependent on acres of disturbed native vegetation	Temporary loss of vegetation and increased risk of weed emergence and dispersion in disturbed areas until reclaimed.
Vegetation – Potential loss during construction	38 acres	41 acres	48 acres	Alt 2 would disturb the least amount of native vegetation; Alt 4 would disturb the largest acreage.

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Wildlife - General	Impacts greatest for birds and animals with low mobility.	Same as Alt 2	Same as Alt 2	Short-term impacts include loss of individuals during construction or direct disturbance of species during critical periods in their life-cycles. Long-term impacts include habitat alterations, electrocutions, and collisions. Impacts would be similar for all alternatives.
Wildlife- Crosses Mule Deer Habitat	19 miles	10 miles	28 miles	Minor to no impact to mule deer population relative to the size of the existing habitat and individual mobility.
Wildlife – Birds	Collisions with transmission line could result in bird loss. Portion of the line located near wetland and the Benton Lake National Wildlife Refuge would experience bird collisions.	Because the line length and location are similar to the existing 115-kV line in Alt 1 (within 1% difference) and both pass near wetlands and the Benton Lake National Wildlife Refuge, impacts to wildlife would be similar to Alt 2.	Same as Alt 3	Bird collision potential is similar for all alternatives.
Fish – Expected Impacts to Water Quality	10 perennial river crossings	6 perennial river crossings	17 perennial river crossings	Alt 3 poses the lowest risk of affecting fish habitat by contributing sediment to streams based on the number of stream crossings.
Special Status Species - Vegetation	All known occurrences are located outside the study area	Same as Alt 2	Same as Alt 2	Risk to vegetation special status species is based on risk to its habitat (wetlands). Alt 3 has the least likelihood of affecting vegetation species of concern because the alignment crosses less riparian habitat than Alts 2 and 4.
Special Status Species – Wildlife Habitat	19.9 miles	11.3 miles	11.7 miles	Alts 3 and 4 would cross the least amount of habitat type used by special status species wildlife.

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Summary of Impacts**
Air Quality - General	Some localized short-term emissions of particulate matter would occur during construction.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Audible Noise - General	Short-term, localized construction noise. Noise from rain or wind on the transmission line would be below BPA and HUD guidelines.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Social Resources	Increased short-term construction and long-term maintenance employment opportunities	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics – Short Term	Short-term construction-related employment would be available.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics - Counties	Long-term operation and maintenance employment would be available. County and State tax revenues would increase.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics - State	Opportunities to export electric power would increase. Increased competition may reduce cost to ratepayers. Creation of opportunities to start up wind generation facilities.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Paleontological Resources – Miles of Geologic Units Crossed With a High Probability of Containing Fossils.	51.6 miles	44.3 miles	44.6 miles	Alt 3 would cross the fewest miles having a surface expression of the Two Medicine Formation which has a high probability of containing fossils. Alternative 2 would cross the most miles over the Two Medicine Formation.
Cultural Resources- Number of Cultural Resources Crossed	Crosses 6 sites eligible for the NRHP and 13 sites of undetermined eligibility.	Crosses 7 sites eligible for the NRHP and 9 sites of undetermined eligibility.	Crosses 3 sites eligible for the NRHP and 20 sites of undetermined eligibility.	Alt 4 would pose a risk to the lowest number of cultural resource sites. Alt 3 would pose a risk to the greatest number of cultural resource sites.
Visuals - General	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast.	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast	Decline in aesthetic quality of a view shed, visual contrast or landscape change due to contrast with natural landscape.
Visuals – Residences within ¼ mile	17 residences	23 residences	22 residences	Alt 2 would be visible from the fewest residences within ¼ mile. Alts 3 and 4 would have similar proximity to residences.
Visuals – Number of Residences ¼ - ½ Mile	60 residences	71 residences	45 residences	Alt 4 would be visible from the fewest residences within ¼ to ½ mile. Alt 3 would be visible to the most residences.
Visuals – Within ½ mile from a Travel Corridor	6.1 miles	7.6 miles	5.0 miles	Alt 4 would be visible from the shortest length of a travel corridor within ½ mile. Alt 3 would have the longest visibility.

Notes:

Alt	Alternative	BPA	Bonneville Power Administration		
EMF	Electric and Magnetic Field	EPA	U.S. Environmental Protection Agency		
Est	estimated	GPS	Global Positioning System	NRHP	National Register of Historic Places
HUD	U.S. Housing and Urban Development	L & C	Lewis and Clark County	TV	Television

3.17.3 Department Findings Necessary for Transmission Line Certification

Under MFSA, DEQ requires a certificate of compliance for development of electric transmission lines. DEQ must find that the selected alternative meets the set of criteria listed under 75-20-301, MCA to be eligible for transmission line certification. Findings for all criteria under each alternative are summarized in **Table 3.17-2**.

TABLE 3.17-2
COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION BY ALTERNATIVE

Finding Number	Finding Criteria	Alternative 1 (no action)	Alternative 2	Alternative 3	Alternative 4
(1)	Within 30 days after issuance of the report pursuant to 75-20-216 for facilities defined in 75-20-104(8)(a) and (8)(b), the department shall approve a facility as proposed or as modified or an alternative to a proposed facility if the department finds and determines:				
(1) (a)	the basis of the need for the facility	Not applicable, the transmission line would not be built.	Additional transfer capacity and transmission access for new wind power generator.	Same as Alternative 2.	Same as Alternative 2.
(1) (b)	the nature of the probable environmental impact	**Table 3.17-1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17-1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.
(1) (c)	that the facility minimizes adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives	Not applicable, the transmission line would not be built.	Most potential adverse environmental impacts are minimized through the application of environmental specifications (**Appendix F**).	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.
(1) (d) (i)	what part, if any, of the line or aqueduct will be located underground	Not applicable	No part of the transmission line would be underground	Same as Alternative 2.	Same as Alternative 2.
(1) (d) (ii)	that the facility is consistent with regional plans for expansion of the appropriate grid of the utility systems serving the state and interconnected utility systems	Not applicable	The transmission line would allow new generators to connect to regional grids and provide a direct connection between Alberta and Montana grid systems.	Same as Alternative 2.	Same as Alternative 2.

TABLE 3.17-2 (Continued)
COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION UNDER 75-20-301, MCA BY ALTERNATIVE

Finding Number	Finding Criteria	Alternative 1 (no action)	Alternative 2	Alternative 3	Alternative 4
(1) (d) (iii)	that the facility will serve the interests of utility system economy and reliability	Not applicable	The transmission line would not affect the system economy. Impact to system reliability is unknown. If the system is determined to adversely impact reliability beyond NERC and NWE reliability criteria tolerance levels, the project will not go forward.	Same as Alternative 2.	Same as Alternative 2.
(1) (e)	that the location of the facility as proposed conforms to applicable state and local laws and regulations, except that the department may refuse to apply any local law or regulation if it finds that, as applied to the proposed facility, the law or regulation is unreasonably restrictive in view of the existing technology, of factors of cost or economics, or of the needs of consumers, whether located inside or outside the directly affected government subdivisions	Not applicable	The location of the facility would conform to applicable state and local laws and regulations either as a permitting or licensed condition, or in compliance with project-specific environmental specifications (**Appendix F).**	Same as Alternative 2.	Same as Alternative 2.
(1) (f)	that the facility will serve the public interest, convenience, and necessity	Not applicable	The facility would serve public interest, convenience and necessity as described in **Table 3.17-3**.	Same as Alternative 2.	Same as Alternative 2.

TABLE 3.17-2 (Continued)
COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION UNDER 75-20-301, MCA BY ALTERNATIVE

Finding Number	Finding Criteria	Alternative 1 (no action)	Alternative 2	Alternative 3	Alternative 4
(1) (g)	that the department or board has issued any necessary air or water quality decision, opinion, order, certification, or permit as required by 75-20-216(3)	No permits would be necessary.	The department would issue all necessary environmental permits and applicable project-specific environmental specifications. MATL has not applied for air or water quality permits.	Same as Alternative 2.	Same as Alternative 2.
(1) (h)	that the use of public lands for location of the facility was evaluated and public lands were selected whenever their use is as economically practicable as the use of private lands	Not applicable	10.1 miles of the line would be located on Montana State and federal land. 120.2 miles would be located on private land.	5.4 miles of the line would be located on Montana State and federal land. 116.2 miles would be located on private land.	11.6 miles of the line would be located on Montana State and federal land. 128.1 miles would be located on private land.
(2)	In determining that the facility will serve the public interest, convenience, and necessity under subsection (1)(f), the department shall Consider the statutory requirements items below and rule-making requirements in **Table 3.17-2**:				
(2) (a)	the items listed in subsections (1)(a) and (1)(b);	See (1)(a) and (1)(b) above	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
(2) (b)	the benefits to the applicant and the state resulting from the proposed facility	The applicant would not make anticipated profit. The state would not receive tax revenue from workers and future related development.	Benefits to the applicant would be the monetary profit from operating the transmission line. Benefits to the state may be more efficient operation of the grid, local tax revenues to counties in which the line is located, state tax revenues from the line, a short-term boost to local economies from construction, future electricity generation, and possible opening of spot electricity market within which Montana utilities can buy electricity.	Similar to Alternative 2.	Similar to Alternative 2 with the exception that the applicant profit would not be adequate to go forward on the project.

TABLE 3.17-2 (Continued)
COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION UNDER 75-20-301, MCA BY ALTERNATIVE

Finding Number	Finding Criteria	Alternative 1 (no action)	Alternative 2	Alternative 3	Alternative 4
(2) (c)	the effects of the economic activity resulting from the proposed facility	Farmers would not experience increased costs from loss of farming acreage or experience difficulty farming due to the poles.	Impacts would be minimal at a state level. Construction benefits would be short term. Line maintenance employment benefits and tax benefits would be long term but likely small at both a county and state level except for Pondera County which could earn up to $1 million per year in tax revenue. Farmers would experience greater costs from loss of farming acreage and difficulty farming due to the poles. Some of these costs would be mitigated by payments from MATL.	Similar to Alternative 2	Similar to Alternative 2 with the exception that cost to farmers from loss of farming acreage and difficulty farming due to the poles would be less due to decreased diagonal crossings on farm fields and increased used of single poles.
(2) (d)	the effects of the proposed facility on the public health, welfare, and safety	Not applicable	The facility would not likely have adverse affects on public health, welfare and safety.	Similar to Alternative 2	Similar to Alternative 2

Notes:

Alt	Alternative
MATL	Montana Alberta Tie Line

4.0 Cumulative and Unavoidable Impacts and Irretrievable Commitments, Regulatory Restrictions Analysis, and Comparison of Alternatives

This chapter describes expected

- Cumulative impacts of the proposed Project and alternatives when combined with past, present, and related future actions
- Unavoidable adverse impacts
- Irreversible and irretrievable commitments of resources
- Short-term use versus long-term productivity
- Regulatory impacts on the applicant's private property rights.

4.1 Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of NEPA define cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). The regulations further explain that "cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

MEPA defines cumulative impacts as "the collective impacts on the human environment of the proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type" (75-1-220(3)). Related future actions may only be considered when these actions are under concurrent consideration by any agency through preimpact statement studies, separate impact statement evaluations, or permit processing procedures (75-1-208(11)).

Analysis of cumulative environmental impacts of a proposed Project and other actions helps to ensure that agency decisions consider the full range of consequences of the agencies' actions to the extent information is available.

Cumulative Impacts Region of Influence

The geographical extent of the analysis area was selected for each resource based on the extent and duration of anticipated effects caused by an action. The cumulative impacts region of influence includes all areas in which planned or expected actions might occur.

Cumulative impacts are identified only where there is a reasonable likelihood that the proposed Project would have a cumulative or incremental effect with other past, present, and reasonably foreseeable. Resources that are likely to experience cumulative impacts in addition to direct and indirect impacts from the action alternatives are: land use, water, wetlands, vegetation, wildlife, air quality, noise, socioeconomic resources, cultural resources, and visual resources. The effects of future actions can be hard to predict, so the cumulative impacts analysis is qualitative rather than quantitative.

Past and Present Actions Potentially Contributing to Cumulative Impacts

The Project study area and vicinity are transected by at least 17 pipelines and 8 transmission lines. Sources of information for linear facilities that transect the study area are: 2005 air photos, field observations, and U.S. Geological Survey topographic maps at a scale of 1:24,000. Existing pipelines in the study area are described in Section 3.3. Existing transmission lines that transect the study area are:

- NWE 100-kV transmission line that runs southwest from Great Falls
- NWE 100-kV transmission line that runs south from Great Falls
- NWE 115-kV transmission line that roughly parallels the route proposed under Alternative 3.
- NWE 161-kV transmission line that runs northeast from Great Falls
- WAPA 115-kV transmission line that runs east-west through Shelby and Cut Bank
- WAPA 161-kV transmission line that runs from Great Falls to Havre
- WAPA 230-kV transmission line that runs between Shelby and Great Falls
- PPL 100-kV transmission lines that connect hydroelectric developments to the Great Falls 230-kV switch yard

Other present and past actions in the vicinity of the proposed Project include ongoing uses such as farming (irrigated and non-irrigated), grazing, weed management, hunting, cities and towns, residential areas, industrial and commercial areas, federal and state highways and county roads, railroads and railroad rights of way, communication facilities, military installations, conservation easements, airports, general recreation, and national trails.

Related Future Actions Potentially Contributing to Cumulative Impacts

Related future actions that could occur in the Project study area include the development of wind farms, a hybrid energy project (wind and biodiesel), a new coal-fired power plant, development of irrigation systems, and the construction of new pipelines delivering petroleum products from Canada to markets within the U.S. Related future actions in the region of the Project area are described in detail in Section 2.6 and summarized below.

- The potential to upgrade the capacity of the MATL proposed transmission line to 400 MW in each direction
- Potential development of a trading system for firm and non-firm capacity for the MATL line. The result would be that generators that ship on the MATL line would have the ability to sell unused capacity to a secondary market during periods when they can not use their full capacity.
- Various planned wind energy projects that would likely be implemented if the MATL line was constructed (**Table 2.6-1**).
- Coal-fired Highwood Generation Station – Southern Montana Electric

Impacts from potential wind farms have been addressed in a general sense in the *Final Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States* (BLM 2005). Several potential wind farms that would ship power on the proposed MATL transmission line are in early development stages. Activities that could impact resources from increased wind energy generation are identified in the Wind Energy Programmatic EIS and repeated in the section. Impacts from the proposed Highwood Generation Station are described in the final EIS for that project (USDA Rural Utilities Service and DEQ 2007). Impacts of pipeline construction would be similar to those described in the final EIS for Express Pipeline (BLM and DEQ 1996).

Land Use and Infrastructure

Existing transmission lines, oil and gas well access, pipelines, and roads have affected and would continue to affect land uses within the analysis area. Additional wind farms with associated roads and power lines are anticipated due to MATL and other transmission lines. Depending on their location, these activities may affect farming operations, remove farmland from production, increase traffic on roads and highways, and pose additional hazards to aircraft. Construction related disruption of existing land uses would be short term and result from construction of wind farms and associated access roads and power lines; pipelines and associated pump stations and power lines; and the proposed Highwood Generating Station and associated railroad spur and interconnecting transmission lines. Follow-up power line and pipeline maintenance using standard equipment would be an infrequent occurrence and not add greatly to the existing traffic loads on the roadway network. Each additional elevated structure or set of structures with wires within a given airspace would be a cumulative element for pilots to avoid and would result in a cumulative impact.

Geology and Soils

Cumulative impacts on geology and soils may result from the construction and operation of future wind farms and pipelines within the project study area, construction of new roads, and the increase and need for new or expanded sand, gravel, and concrete operations in the area. Most wind energy projects include best management practices to mitigate impacts from blasting, excavation, earthmoving, and other construction activities (BLM 2005), and these adverse cumulative impacts are likely to be minor, indirect, and short term. Any cumulative impacts that might occur would be minimal and largely limited to the areas actually disturbed.

EMF

If the line capacity is increased to 400 MW in each direction, the electric field at the edge of the right of way would increase and the mean magnetic field would also be higher based on the increased wattage.

Water Resources

Past and present actions potentially affecting water resources in the vicinity of the analysis area are: ongoing weed management, fertilization, crop production, grazing, road use and maintenance, and waterway modifications for stock watering. These activities can result in surface water flow alterations, water diversions, and stream bank modification and destabilization. Weed control and fertilization can introduce pesticides and nitrates and total dissolved solids to water supplies. Irrigation and waterway modifications for stock can result in increased salinity and flow reduction due to stream channel obstructions and diversions, and saline seep. Some grazing practices result in sedimentation to surface water due to soil destabilization from reduced vegetation. Road maintenance and use at river and stream crossings can destabilize banks and increase sedimentation to surface water.

DEQ has determined that seven water bodies in the analysis area have impaired or threatened beneficial uses by one or more of the activities described above: Missouri River, Benton Lake, Lake Creek, Teton River, Pondera Coulee, Cut Bank Creek, and Old Maids Coulee. These water bodies and their impairment causes and sources are described in Section 3.5 under water resources and in **Appendix I**. Of these water bodies, the Teton River and Pondera Coulee would be crossed by all action alternatives. The Teton River is classified as Category 4A: "all TMDLs (total maximum daily loads) needed to rectify all identified threats or impairments have been completed and approved but impaired beneficial uses have not yet achieved fully supporting status." Pondera Coulee is classified as Category 5: "one or more applicable beneficial uses have been assessed as being impaired or threatened and a TMDL is required." The effects of present and past actions in the analysis area, when added to potential adverse impacts from the action alternatives, would cumulatively present an increased risk of impairment of one or more beneficial uses. This would be a minor long-term adverse cumulative impact to water resources.

Related future actions include the construction and operation of future wind farms and pipelines in response to the availability of increased transmission capability within the project study area. Activities that could impact water resources from increased wind energy generation are identified in the Wind Energy Programmatic EIS as occurring primarily during construction and include:

- Potential reduction in existing water supply sources due to withdrawals during construction
- Increased soil erosion due to ground disturbing activities such as heavy equipment traffic and extraction of geologic materials from borrow areas or quarries.
- Wastewater discharges
- Pesticide application
- Diversion of surface water flows by access road systems, storm water control systems, or excavation activities
- Construction activity alteration of interaction between surface water bodies and local groundwater in systems where the two resources are hydrologically connected.

These activities when combined with the proposed Project or alternatives would cumulatively increase the risk of introducing sediment and other pollutants to water resources in the analysis area and potentially affect the quantity and quality of available water supplies. Construction of these projects would likely cause increased stormwater runoff and potential soil erosion that may carry sediments to surface waters. Because the action alternatives for the MATL Project and projects that might be permitted through the Wind Energy Programmatic EIS would include implementation of mitigation measures to reduce risk of sedimentation, employ proper pesticide application procedures, and comply with waste water discharge requirements, these adverse cumulative impacts are likely to be minor and short term.

Wetlands

Cumulative impacts on wetlands may result from the construction and operation of future wind farms, pipelines, and the Highwood Generation Station within the Project study area. In particular, the area around Cut Bank has good wind power generation potential and also a high concentration of semi-permanent and seasonal wetlands (often referred to as prairie potholes) that provide important habitat for many birds and small mammals. The Benton Lake NWR, located in the southern portion of the Project area, contains the combination of wetlands and grasslands that is important to the management of many waterfowl and wildlife species.

Impacts to wetlands from potential wind farms have been addressed in a general sense in the BLM Wind Energy Programmatic EIS (BLM 2005). Activities that could impact wetlands would occur primarily during construction. The potential impacts would be:

- Habitat disturbance
- Direct injury or mortality
- Erosion and runoff
- Exposure to contaminants
- Facility construction activities

Because the action alternatives for the MATL Project, future wind farms, and the Highwood Generation Station would typically include mitigation measures to reduce disturbance to wetlands, these adverse cumulative impacts are likely to be minor, indirect, and short term.

Native Vegetation

Most of the native vegetation communities in the alignments have been converted to farmland. In some areas, native vegetation is still present and subject to grazing pressure, which may change community structure and composition, in addition to providing disturbed areas for weedy species establishment. Past development of pipelines, oil wells, and access roads to these structures has further reduced native vegetation communities. It is highly likely that more native communities would be disturbed or reduced as wind farms, irrigation systems, or petroleum pipelines are developed in the region. Depending on reclamation practices, impacts to native vegetation can be reduced.

Wildlife

Past activities that have impacted wildlife resources within the analysis area include: loss of native grassland habitat due to agricultural development, loss of wetland habitat due to drainage for agriculture, and minor loss in habitat and disturbance related to oil and gas development and construction of associated pipelines. These activities have resulted in some displacement of wildlife due to habitat loss; however, many of the wildlife species have been able to adapt to habitat conversions and have not been negatively impacted. Species that have experienced the greatest impacts are those species dependent on native grassland habitats, such as grassland dependent birds that have experienced a loss of nesting habitat. Present activities within the analysis area are very similar to activities of the past. Agriculture is the predominant use of land; however, grassland and wetland conversion to agricultural lands no longer occurs at a high rate. Land use within the region is relatively stable and land use practices do not generally negatively impact wildlife.

Related future actions, described in Section 2.7, would result in disturbance and displacement of wildlife during the construction phase, followed by some permanent loss of habitat. Wind farms could have an impact on avian species due to displacement from habitats and collisions though these impacts may be reduced with sound siting practices.

The MATL transmission line would contribute to habitat loss and potentially increase avian mortality due to collisions. The cumulative impacts of the habitat loss would not likely reduce the viability of wildlife populations within the region, as structures would reduce habitat by a relatively small amount and would not likely consume critical habitats such as large expanses of grasslands or riparian areas.

The Highwood Generation Station would impact wildlife and other biological resources by temporarily displacing wildlife due to removal of vegetation and disturbance from construction equipment. The Highwood Generation Station and wind turbines would result on long-term increase in mortality of terrestrial mammals by rail strikes and increased traffic on access roads. There is some potential for increased mortality to birds and bats from blade strikes.

Threatened, Endangered, and Special Status Species

Cumulative impacts to vegetation and wildlife special status species would not differ from those effects discussed within the Wildlife and Native Vegetation sections above.

Air Quality

Past and present actions potentially affecting air resources in the vicinity of the analysis area are: petroleum refining plant (MRC refinery), crude oil and natural gas compressor stations, petroleum product terminals, coal-fired electrical generating plants, concrete mix plants, asphalt mix plants, crematoriums, gravel crushers and associated processing equipment, fugitive dust and smoke sources from farming, field and forest burning, and dust from gravel roads. These sources may affect air quality within the general area of the activity and, possibly, the air shed, depending on the duration and nature of the emission. For emission sources such as construction activities, burning, and road dust the effects are anticipated to be temporary in duration. For emission sources such as refineries, power generating plants, and crematoriums, the impacts would be regulated through permits by DEQ. In general, these activities, when occurring at the same time as, and in the vicinity of, MATL construction activities, are anticipated to have minor adverse cumulative impacts.

The potential impacts of future wind farm developments have been generally addressed in the BLM Wind Energy Programmatic EIS (BLM 2005). Impacts to air resources are anticipated to be temporary. Fugitive gaseous and particulate emissions from construction and operation and maintenance would stop or decrease once these activities are completed. These activities, when combined with the proposed Project or alternatives, would cumulatively increase the risk of affecting air quality in the study area. Given that mitigation measures such as dust suppression for fugitive emissions, would be implemented, and stationary sources would need to comply with emission standards set by DEQ, these cumulative impacts are anticipated to be minor and short term.

Noise

Noise would be cumulatively affected by the proposed action and the development of wind generation activities. Noise contributed by wind generators could affect nearby residences if the turbines are operated at a wind speed less than about 23 miles per hour (BLM 2005). Cumulative impact from wind turbine noise and the transmission line under Alternative 2 depend on proximity to residences.

Noise contributed by planned wind development would be generated by construction and maintenance activities and generator operations. Construction activities would be similar to those proposed under MATL with the addition of potential blasting. During operation, major noise sources would be aerodynamic noise, transformer and switchgear noise from substations, corona noise from transmission lines, vehicular traffic noise, including commuter and visitor and material delivery, and noise from an operation and maintenance facility, if present. Overall, noise levels of continuous site operation would be lower than the noise levels associated with short-term construction activities (BLM 2005).

At a wind speed of about 48 miles per hour, wind-generated noise is higher than aerodynamic noise. Noise from wind turbines would be more noticeable at lower wind speeds (BLM 2005).

Socioeconomic

The proposed Project and action alternatives would be constructed in an area with major wind generation potential. Implementation of the proposed Project would provide the transmission capacity needed by wind generation projects to access the energy market. At the time of this analysis, up to four wind energy generation projects are likely to occur in the foreseeable future. For instance, Great Plains Wind and Energy, Inc. indicated plans to construct a 45 to 60-turbine wind farm that would straddle the border between Toole and Glacier counties. The Great Plains project could reportedly add $15 million to the two counties' tax base over the next 20 years. During the construction phase, the Great Plains project is estimated to require 250 workers, most of whom would be hired locally. When completed, the project would continue to provide 5 to 15 full-time jobs (Simonetti 2006). Details of other potential projects were not available, but would likely result in similar economic benefits to the region. Case studies of three other wind generation projects occurring elsewhere in the nation indicate economic benefits may vary widely from project to project. For instance, the construction phase of a wind generation project may generate up to 100 jobs while the operation and maintenance phase may provide between 6 and 31 permanent jobs and between $103,000 and nearly $1 million dollars in additional annual personal income. Wind projects also provide additional landowner revenue in the form of lease payments. Assuming that these types of projects cause little or no increase in government or school budgets, tax payments made by project owners may have the additional benefit of reducing the local tax burden for other local tax payers (Northwest Economic Associates 2003).

Visuals

All action alternatives when combined with past and present (existing transmission lines) actions and actions reasonably expected to occur (wind energy development projects and the Highwood Generating Plant), would increase the adverse impact to the aesthetic quality of the landscape for the long term. Wind generation facilities would be expected to be highly visible because of the introduction of turbines into typically rural or natural landscapes, which have few other comparable structures. In regions with variable terrain, wind developments along ridgelines would be most visible.

A summary of cumulative impacts for the action alternatives is presented in **Table 4.1-1**. **Table 4.1-1** describes impacts for Alternative 2 as proposed by the applicant with the addition of environmental specifications (**Appendix F**).

4.2 Unavoidable Adverse Impacts

This section summarizes the adverse effects that cannot be mitigated that are expected to occur with implementation of the action alternatives.

Unavoidable short-term adverse impacts would be expected to occur to wetlands, land use, visuals, and native vegetation. Long-term unavoidable adverse impacts would occur to land use, birds, and visuals. Construction and operation activities could have adverse impacts on wetland resources from the alteration of surface water drainage patterns, disturbances and trampling of vegetation during construction, and from an increase in sedimentation to localized wetland areas from disturbances on adjacent properties. Transmission line structures would not be placed in wetland areas, so no long-term impacts are expected for wetland resources. Native vegetation would be unavoidably disturbed and weed infestations may occur for the short term during construction and before reclamation. Use of travel routes could be unavoidably obstructed during construction. Long-term impacts to land use include loss of production of farmland, increased risk to aircraft, and interference with farming activities. An increase in avian mortality would be unavoidable and long term. Visual resources would experience unavoidable major adverse impacts to the aesthetic quality of the landscape by transmission lines.

TABLE 4.1-1
CUMULATIVE IMPACTS FROM PAST, PRESENT, AND FUTURE ACTIONS AND ALL ACTION ALTERNATIVES

Resource	Direct and Indirect Impacts From Action Alternatives	Past and Present Actions that Affect the Resource	Reasonably Forseeable Future Actions That Could Affect the Resource	Cumulative Impacts
Land Use & Infrastructure	Loss of production due to structures & roads, increased risk of weed introduction and spread, risk of equipment damage from hitting a structure, increased time to farm around poles, and some GPS-guided equipment may be affected. Cropland crossings also increase the risk of crop duster accidents. During construction, facility construction traffic may conflict with movement of farm equipment on roads. Alt 3 would disturb the least amount of land. Alt 4 would disturb the most. Alt 4 crosses the least total cropland and diagonally. Alt 3 crosses the most cropland. Alt 4 would result in the fewest acres of cropland removed from production due to poles. Alt 4 requires the use of monopoles for crossing all cropland.	Existing constructed network of pipelines and transmission lines. Ongoing farming, grazing, weed management, hunting, cities and towns, residential areas, industrial and commercial areas. Use and maintenance of federal and state highways and county roads, railroads and railroad rights of way, communication facilities, military installations, conservation easements, airports, general recreation, and national trails.	The Highwood Generation Station and various planned wind energy projects would likely be implemented if the MATL line was constructed.	Depending on the location of additional wind farms, combined with oil and gas well access roads and other transmission lines, these activities may affect farming, remove farmland from production, increase traffic on roads and highways, and pose additional hazards to aircraft. The impacts during construction would be primarily short term and of minor magnitude. Other long-term cumulative impacts would be from impacts of farming around structures located in cropped fields. Follow-up power line maintenance using standard equipment would be an infrequent occurrence and not add greatly to the existing traffic loads on the roadway network. Each additional elevated structure or set of structures with wires within a given airspace would be a cumulative element for pilots to avoid and would result in a cumulative impact.

TABLE 4.1-1 (Continued)
CUMULATIVE IMPACTS FROM PAST, PRESENT, AND FUTURE ACTIONS AND ALL ACTION ALTERNATIVES

Resource	Direct and Indirect Impacts From Action Alternatives	Past and Present Actions that Affect the Resource	Reasonably Foreseeable Future Actions That Could Affect the Resource	Cumulative Impacts
Geology & Soils	Risk of mass movement, soil compaction, mixing of soil horizons, and soil erosion. Alternative 4 poses the highest risk of mass movement and soil erosion. Alternative 3 has the least risk of mass movement. Alternative 2 has the least risk of soil erosion. Soil compaction and mixing are expected to be proportional to the length of the alternative.	Grazing, road maintenance.	The Highwood Generation Station and various planned wind energy projects would likely be implemented if the MATL line was constructed. Related new or expanded sand, gravel, and concrete operations in the area.	Same as direct and indirect impacts.
Engineering & Hazardous Mat.	None	Maintenance of federal and state highways and county roads, railroads. Use of farm machinery around poles. Potential contamination from refueling and servicing farming and construction equipment.	Ash and waste water treatment byproducts from the Highwood Generation Station.	Similar to direct and indirect impacts
EMF	None	Existing constructed network of transmission lines.	Potential upgrade of the MATL line to 400 MW in each direction.	None

TABLE 4.1-1 (Continued)
CUMULATIVE IMPACTS FROM PAST, PRESENT, AND FUTURE ACTIONS AND ALL ACTION ALTERNATIVES

Resource	Direct and Indirect Impacts From Action Alternatives	Past and Present Actions that Affect the Resource	Reasonably Foreseeable Future Actions That Could Affect the Resource	Cumulative Impacts
Water	Risk of sediment discharge to surface water during construction at river and stream crossings. Alt 3 poses the lowest risk, and Alt 4 poses the highest risk of contributing sediment to streams.	7 water bodies in the analysis area have impaired or threatened beneficial uses by one or more of the following: weed management, crop fertilization and production, grazing, road use and maintenance, waterway modifications for stock watering.	Operation of the Highwood Generation Station and various planned wind energy projects would likely be implemented if the MATL line was constructed.	Increased risk of introducing sediment and other pollutants to water resources in the analysis area and potentially affect the quantity of available water supplies.
Wetlands	Risk of change in wetland hydrology due to construction disturbance. Impacts would be mitigated or eliminated with implementation of mitigation measures. Alt 3 crosses the least amount of ground and Alt 4 the most that contains wetlands or potential wetlands.	Farming, grazing, weed management. Road use and maintenance, waterway modifications for stock watering.	Operation of the Highwood Generation Station and various planned wind energy projects would likely be implemented if the MATL line was constructed.	Same as direct and indirect impacts.
Vegetation	Temporary loss of vegetation and increased risk of weed emergence and dispersion in disturbed areas until reclaimed. Alt 3 would disturb the least amount and Alt 4 the most of native vegetation.	Grazing, crop cultivation, weed management, Construction of roads, cities and other facilities.	Operation of the Highwood Generation Station and various planned wind energy projects would likely be implemented if the MATL line was constructed.	Same as direct and indirect impacts.

TABLE 4.1-1 (Continued)
CUMULATIVE IMPACTS FROM PAST, PRESENT, AND FUTURE ACTIONS AND ALL ACTION ALTERNATIVES

Resource	Direct and Indirect Impacts From Action Alternatives	Past and Present Actions that Affect the Resource	Reasonably Foreseeable Future Actions That Could Affect the Resource	Cumulative Impacts
Wildlife	Short-term loss of individuals during construction or direct disturbance of species during critical periods in their life-cycles. Long-term habitat alterations, electrocutions, and collisions would result in avian mortality. Impacts would be similar for all alternatives.	Habitat conversion to agriculture; loss of native grassland habitat due to agricultural development; loss of wetland habitat due to drainage for agriculture; and, minor loss in habitat and disturbance related to petroleum pipeline and irrigation development.	Operation of the Highwood Generation Station and various planned wind energy projects would likely be implemented if the MATL line was constructed.	Constructed developments may reduce habitat by a relatively small amount and would not likely consume critical habitats such as large expanses of grasslands or riparian habitats. Operation of wind farms would contribute to long term avian mortality and potentially adversely affect bird migration patterns.
Fish	Risk of habitat degradation through sediment discharge to streams and rivers at alignment crossings during construction. Alt 3 presents the lowest risk to fish habitat, Alt 4 presents the greatest risk.	Weed management, crop fertilization and production, grazing, road use and maintenance, waterway modifications for stock watering.	The operation of the Highwood Generation Station.	Same as direct and indirect effects
Special Status Species	Risk to special status plant species is based on risk to habitat (wetlands). Alt 3 would have the least affect on species of concern. Alts 2 and 4 would have similar risk.	Existing transmission lines. Farming, hunting, cities and towns, residential areas, industrial and commercial areas. Construction of federal and state highways and county roads, railroads, military installations, and airports.	Operation of the Highwood Generation Station and various planned wind energy projects would likely be implemented if the MATL line was constructed.	Same as for Wildlife and Vegetation

TABLE 4.1-1 (Continued)
CUMULATIVE IMPACTS FROM PAST, PRESENT, AND FUTURE ACTIONS AND ALL ACTION ALTERNATIVES

Resource	Direct and Indirect Impacts From Action Alternatives	Past and Present Actions that Affect the Resource	Reasonably Foreseeable Future Actions That Could Affect the Resource	Cumulative Impacts
Air Quality	Alts 3 and 4 would cross the least amount of habitat type used by special status species wildlife.	Refinery, crude oil and natural gas compressor stations, petroleum product terminals, coal-fired electrical generating plants, concrete mix plants, asphalt mix plants, crematoriums, gravel crushers and associated processing equipment, asphalt plants, fugitive dust and smoke sources from farming, field and forest burning, and dust from gravel roads.	Various planned wind energy projects that would likely be implemented if the MATL line was constructed. The operation of the coal-fired Highwood Generation Station by Southern Montana Electric would result in a long-term minor to moderate degradation of local air quality.	Minor short term releases of fugitive gaseous and particulate emissions during the construction phases and operation and maintenance efforts of additional facilities would cumulatively increase risk of affecting air quality in the study area.
Audible Noise	Short-term, localized construction noise. Noise from rain or wind on the transmission line would be below BPA and HUD guidelines	Cities and towns, industrial and commercial areas. Use and maintenance of federal and state highways and county roads, railroads and railroad rights of way, military installations, airports,	Various planned wind energy projects that would likely be implemented if the MATL line was constructed. Noise levels from the operation of the Highwood Generation Station would be audible for several miles from the site.	Noise contributed by wind generation power could affect nearby residences if operated at a wind speed less than 23 miles per hour. Cumulative impact from noise and Alternative 2 is dependent on proximity to residences.

TABLE 4.1-1 (Continued)
CUMULATIVE IMPACTS FROM PAST, PRESENT, AND FUTURE ACTIONS AND ALL ACTION ALTERNATIVES

Resource	Direct and Indirect Impacts From Action Alternatives	Past and Present Actions that Affect the Resource	Reasonably Foreseeable Future Actions That Could Affect the Resource	Cumulative Impacts
Socioeconomics	Increased short-term construction and long-term employment opportunities County and State tax revenues would increase. Opportunities to export electric power & start up new generation sources would increase. Increased competition may reduce cost to ratepayers.	Existing constructed network of pipelines and transmission lines. Ongoing farming, grazing, weed management, hunting, cities and towns, residential areas, industrial and commercial areas.	Potential development of a trading system for firm and non-firm capacity for the MATL line. Various planned wind energy projects that would likely be implemented if the MATL line was constructed. Construction and operation of the coal-fired Highwood Generation Station would have a moderate beneficial effect.	Each new wind generation and a coal-fired generation station would increase jobs by 4 - 26 people during construction and add $98,000 - $400,000 in additional personal income to a region. Operation and maintenance phase may provide 6 - 31 permanent jobs and $103,000 - $1,000,000 in additional annual personal income. Wind projects also provide additional landowner revenue. Tax payments by project owners may reduce the tax burden for other local tax payers
Paleontological & Cultural Resources	Construction activities pose a risk of disturbance of undiscovered cultural & paleontological resource sites and sites not yet adequately inventoried. Alt 2 crosses fewer sites of undetermined eligibility for National Register listing than Alt 4 and more than Alt 3.	Farming, cities and towns, residential areas, industrial and commercial areas. Construction of federal and state highways and county roads, railroads and railroad rights of way, communication facilities, military installations, and airports.	Various planned wind energy projects that would likely be implemented if the MATL line was constructed.	Each wind generation construction site would be required to inventory for cultural resources before disturbance. No cumulative impacts are anticipated.

TABLE 4.1-1 (Continued)
CUMULATIVE IMPACTS FROM PAST, PRESENT, AND FUTURE ACTIONS AND ALL ACTION ALTERNATIVES

Resource	Direct and Indirect Impacts From Action Alternatives	Past and Present Actions that Affect the Resource	Reasonably Foreseeable Future Actions That Could Affect the Resource	Cumulative Impacts
Visuals	Decline in aesthetic quality of a view shed, visual contrast or landscape change due to contrast with natural landscape. Visual impacts are dependent on proximity to viewers. Alt 4 would be visible to fewer residences (within ½ mile) and fewer travel corridor miles. Alt 3 would be most visible.	Existing constructed network of transmission lines. Installation of federal and state highways and county roads, communication facilities, military installations and airports.	Various planned wind energy projects that would likely be implemented if the MATL line was constructed.	Wind generation facilities would be highly visible and not compatible with the natural landscape. Operating windmills would generate a strobe effect and blade glint. Red tower lights at night would also adversely impact visual resources.

Notes:

Alt	Alternative
BPA	Bonneville Power Administration
EMF	Electric and Magnetic Field
GPS	Global Positioning System
HUD	Housing & Urban Development
MATL	Montana-Alberta Tie Line
MW	Megawatt

4.3 Irreversible and Irretrievable Commitments of Resources

No irreversible and irretrievable commitments of resources would occur after decommissioning the transmission line at the end of its use. If concrete footings are used, the concrete would be left and irreversibly committed. Fuel used during construction and decommissioning would be irreversibly committed to the project. If wood structures are used, it is probable that these poles would not be available for future transmission projects and would be irreversibly committed to the project. Energy lost during the transmission process (line losses) would be irretrievably committed to the project.

4.4 Short-Term Use and Long-Term Productivity

Short-term uses of the study area are characterized by existing land use of the area as affected by the proposed Project and all activities that such land use facilitates. Long-term productivity involves sustaining the interrelationships of each resource in a condition sufficient to support ecological, social, and economic health.

All action alternatives would manage resources within requisite regulatory standards for air quality, water quality, cultural resource preservation, and wildlife management, and thus would maintain long-term productivity. Impacts from any of the action alternatives to visual resources and farming activities would not adversely affect long-term productivity of the resource. Beneficial impacts to socioeconomic resources would be realized from all action alternatives. Because Alternative 4 contains additional environmental mitigation measures for avoiding adverse impacts to farming, riparian areas, and surface water, this alternative presents the most protective alternative for the maintenance and enhancement of long-term productivity of the environment while benefiting socio-economic resources.

4.5 Regulatory Restrictions Analysis

Alternatives and mitigation measures are designed to further protect environmental, cultural, visual, and social resources, but add to the cost of the Project. Alternatives and mitigation measures that are required by federal or state laws and regulations to meet minimum environmental standards do not need to be evaluated for extra costs to the proponent.

Mitigation measures that might be imposed by DEQ would add up to 3 percent to the cost of the proposed Project (**Table 4.5-1**). Alternative 3 would be less expensive to build than the proposed Project. Alternative 4 would be up to 16 percent more expensive (**Table 4.5-1**). Mitigation measures whose costs can be estimated are precision mapping of unstable soils, archaeologist observation of construction, wetlands delineation, and bonding for reclamation and revegetation. Monopole structures might also be required in some areas.

TABLE 4.5-1
REGULATORY RESTRICTIONS ANALYSIS

	Alternative 2			Alternative 3	Alternative 4
	with bond mitigation only	with additional mitigation measures	with monopoles and additional mitigation measures	no additional mitigation measures	with additional mitigation measures
Length (miles)	129.9 (all H-frames)	129.9 (all H-frames)	129.9 (25 miles monopoles, 104.9 miles H-frames)	121.6 (all H-frames)	139.9 (87.9 miles monopoles, 52 miles H-frames)
Construction cost[a]	$38,125,650	$38,125,650	$38,950,650	$35,689,600	$43,961,350
Precision mapping of unstable soils[b]	0	$11,000 (11 miles)	$11,000 (11 miles)	$6,000 (6 miles)	$24,000 (24 miles)
Professional archaeologist to observe construction[c]	0	$160,000 (35 sections)	$160,000 (35 sections)	$160,000 (37 sections)	$160,000 (35 sections)
Delineate wetlands on alignment through Teton County[d]	0	$11,500 (23 miles)	$11,500 (23 miles)	$13,000 (26 miles)	$13,000 (26 miles)
Estimated bond	$500,000	$500,000	$500,000	$420,000	$615,000
Total cost	$38,625,650	$38,808,150	$39,633,150	$36,288,600	$44,773,350
Percent change	0	+0.4	+3	-6	+16

[a] H-frame structures $293,500 per mile; long-span monopole structures $326,500 per mile (MATL 1/26/07).

[b] $1,000 per mile of alignment, 500 feet wide.

[c] $1,000 per day each for two full-time archeologists for 4 months.

[d] $1,000 per day per wetland specialist at 2 linear miles of alignment per day.

The costs of other measures, such as damage payments and requiring the use of conductors with dulled, non-reflective surfaces, are not readily quantifiable but would add to the total cost of the Project.

MATL has already negotiated easements across portions of the proposed Project alignment. The cost to MATL is unknown. If MATL has already paid for right-of-way access to lands that may be crossed by the Alternative 2 alignment, and that alignment is not permitted, MATL may lose the money already spent.

Alternative 2 with additional mitigation measures and the use of long-span monopoles on selected portions of the transmission line would impose the least regulation on MATL's private property rights while reducing environmental impacts.

5.0 Consultation and Coordination

MFSA requires that a project applicant consult with government agencies to identify their concerns over the facility's possible locations or effects on the environment, to discuss mitigation measures suggested by the agencies, and to explain how the agency concerns were incorporated into identifying the proposed project and alternative locations. MEPA and NEPA require DEQ and DOE to consult with local, federal, and state agencies about the proposed Project during the project scoping.

DEQ and DOE have consulted with the applicant, other federal and state agencies, local governments, and with individuals and non-government stakeholders. The consultation process took place during scoping and follow-up discussions. Interested individuals and organizations, affected federal, state, and local agencies, as well as affected Indian Tribes were invited to submit comments to DEQ and DOE. MFSA requires FWP, DNRC, MDT, the Department of Revenue, and the Public Service Commission to report their recommendations on this project to DEQ. Results of this reporting will be incorporated into the final EIS.

Initial Consultation and Coordination

The MFSA consultation process began on May 9, 2005, when MATL representatives met with DEQ personnel to introduce the proposed project and discuss issues or concerns during initial stages of the MFSA application process. MATL conducted open house sessions in Conrad and Cut Bank, Montana, on June 29 and 30, 2005, to provide the public an opportunity to meet representatives of the MATL project team and obtain information on the scope of the project. These open houses provided a venue for the public to voice and document their concerns and issues to MATL.

DEQ hosted an interagency project meeting on August 26, 2005, in Helena, Montana, to familiarize participating agency personnel with the proposed Project, to field agency questions, and to formalize agency roles and responsibilities. Attendees for the August 26, 2005 meeting included personnel from the following agencies:

- DEQ
- U.S. Department of Energy (DOE; via teleconference)
- Montana Fish, Wildlife and Parks (FWP)
- Montana Department of Transportation (MDT)
- Montana State Department of Commerce
- DNRC

MATL submitted a MFSA application to DEQ on December 1, 2005, and submitted additional information and/or amended the application on January 11, January 24, March 16, March 30, June 9, July 31, August 11, November 30, and December 15, 2006.

Public Scoping

Three public scoping meetings were held in Cut Bank, Conrad, and Great Falls in early December 2005. The scoping process is discussed in sections 1.5 and 1.6. A follow-up meeting was held in Cut Bank on June 26, 2006. The December 2005 and June 2006 public meetings were advertised in *The Valierian*, *The Cut Bank Pioneer Press*, *The Glacier Reporter*, and *The Shelby Promoter* for a 3-week period prior to meetings. Based on the additional public comments and to address deficiencies in the original December 1, 2005, application, MATL revised its MFSA application and provided additional information as discussed above.

DOE also published a Notice of Intent to Prepare an Environmental Assessment and to Conduct Public Scoping Meetings in the *Federal Register* on November 18, 2005 (70 FR 69962). A copy of this notice was transmitted by mail to land owners in the study area.

Formal and Informal Consultation and Coordination

In addition to the general meetings and telephone contacts, DEQ hosted a meeting in Great Falls on October 6, 2006, to share information about multiple projects that may involve construction in and around the NWE Great Falls 230-kV switch yard. Meeting attendees for the October 6, 2006, Great Falls meeting included personnel from the following agencies and organizations:

- DEQ
- MATL
- NorthWestern Energy Corporation
- Western Area Power Administration (WAPA)
- PPL Montana
- Montana Fish, Wildlife and Parks (FWP)
- Sheffels Farms, Inc.
- Joe Stanek Farms (area landowner)
- Tetra Tech

Concerned citizens have submitted written comments and suggestions and have called DEQ throughout the process.

DEQ, DOE, and MATL have sought consultation from other interested individuals, SHPO, and non-government organizations, as well as affected Indian Tribes. Formal consultation with SHPO is ongoing. **Table 5.0-1** provides a listing of the non-government stakeholders that were contacted by MATL or DEQ about the proposed MATL project.

MATL also sought consultation with the Blackfeet Tribal Council in Browning. On September 12, 2005, MATL and representatives from their project team met with Blackfeet Tribal Council members in Browning to discuss potential effects on tribal economic, social, and traditional lands interests. Blackfeet Tribal Council members, staff, and interested parties in attendance included: Owna Scott-Big Bull, William Big Bull, John Murray, Teri Lawrence, Wendy Running Crane, Brian Crawford, Terry Tatsey, Douglas Quade, Curly Bear Wagner, Joseph Weatherwax, Kenneth Augare, Gerald Wagner, Pat Schildt, and Earl Old Person. Following introductions and a brief project overview provided by MATL personnel, Blackfeet Councilmen, staff, and tribal members raised several substantive issues that were addressed or recorded for follow-up.

TABLE 5.0-1
MATL PROPOSED PROJECT
NON-GOVERNMENTAL ORGANIZATIONS CONTACTED

Organization	Contact Person	Contact Information
Ducks Unlimited	Layne Krumwiede Regional Director	1023 West St. Lewistown, MT 59457 (406) 538-9094
Northern Plains Resource Council	Teresa Erickson Staff Director	2401 Montana Ave. Suite 200 Billings, MT 59101 (406) 248-1154
Montana Environmental Information Center	Patrick Judge Energy Program Director	P.O. Box 1184 Helena, MT 59624 (406) 443-2520
Montana Stockgrowers Association	Steve Pilcher Director	420 No. California Ave. Helena, MT 59601 (406) 442-3420
Montana Stockgrowers Association	Keith Schott President	750 6th St. S.W. P.O. Box 1165 Great Falls, MT 50403 (406) 761-4596
The Nature Conservancy	Susan Benedict Program Associate	32 South Ewing Helena, MT 59601 (406) 443-0303
Montana Land Reliance	William Long Managing Director	324 Fuller Ave. P.O. Box 355 Helena, MT 59624-0355 (406) 443-7027
National Audubon Society, Montana Chapter	Janet Ellis Acting Exec. Director	P.O. Box 595 Helena, MT 59624 (406) 443-3949
Alternative Energy Resources Organization	--	432 N. Last Chance Gulch Helena, MT 59601 (406) 443-7272
Natural Heritage Program	Sue Crispin Director	1515 East 6th Avenue P.O. Box 201800 Helena, MT 59620
Sheffels Farms	Jim or John Sheffels Owners/operators	Box 1545 Great Falls, MT 59403
Stanek Property	Joe Stanek or Lyle Meeks	Lyle Meeks, P.E. NCI Engineering Inc. P.O. Box 6350 Great Falls, MT 59401
Diamond Valley Area Landowners	Katrina Martin	Ms. Katrina Martin Dutton, MT 59433 (406) 463-2337

6.0 List of Preparers

Department of Environmental Quality

Tom Ring	Project Coordinator	B.S., Fish and Wildlife Management B.S., Earth Science
Greg Hallsten	Project Coordinator	B.S., MS Range Management B.S., Wildlife Biology
Warren McCullough	EIS Reviewer	B.A., Anthropology M.S. Geology
Nancy Johnson	Visuals EIS Reviewer	B.S., Education M.S., Secondary Education M.L.A, Landscape Architecture
Jeff Blend	Socioeconomics Transmission System Analysis	B.S., Economics M.S., Economics PhD., Agricultural Economics

Tetra Tech

Cameo Flood	Assistant Project Manager Land Use, Farming and Ranching	B.S., Forestry
J. Edward Surbrugg	EIS Project Manager Vegetation/Wetlands	B.S., Range Ecology M.S., Land Rehabilitation Ph.D., Soil Science
Jim Dushin	Visual Simulations	A.AS., Forestry B.S., Wildlife Biology
Chris Reynolds	Geology and Soils	B. S., Geology M.S. Geochemistry/Hydrogeology
Ed Madej	Database/GIS	B.S., Biology and Oceanography
Stacy Pease	Wildlife/Fisheries	M.S. Watershed Management B.S. Wildlife and Fisheries Science
Gary Sturm, P.E.	Engineering	B.S., Engineering Physics M.S., Civil Engineering
Alicia Stickney	Editorial Review, Community Resources	B.A., English M.S., Geology
Alice Stanley	MEPA/NEPA Specialist Hydrology	B.S., Geology M.S., Geology
Alane Dallas	Word Processing/ Admin Record	
Linda Daehn	Public Relations	B.S., Journalism
Dan Buffalo	Groundwater	M.S., Water Resources Management B.S., Biology
Chris Martin	Surface Water/Visuals	M.S. Coursework, Mathematics Teacher Cert/B.A. Equiv., Mathematics B.S., Watershed Science – Hydrology
Earl Griffith	Utilities and Transportation	B.S., Earth Science (Geology) M.S., Earth Science (Geology)

H. Mark Blauer	Human Health and Environment	PhD., Nuclear Chemistry M.S., Earth and Space Sciences B.S., Chemistry
Heidi Raymer	Electromagnetic Effects	B.S., Nursing B.S., Environmental Occupational Safety and Health
Jay Rose	Presidential Permit	B.S., Ocean Engineering J.D.
Amy Sivers	Hazardous Materials	M.S., Geosciences B.A., Geography
C. Ray Windmueller	Air	B.S., Petroleum Engineering
Nancy Linscott	Socioeconomics and Environmental Justice	B.S., Earth Science (Geology) M.S., Environmental Policy and Management
Keith Cron	Noise	M.S., Industrial Hygiene B.S., Science and Engineering

HRA

Weber Greiser	Cultural Resources	B.S., Anthropology M.A., Anthropology

Glossary

Affected Environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Air Pollution: Dust, fumes, smoke, other particulate matter, vapor, gas, odorous substances or any combination of these.

Alignment: The facility location.

Alluvial: Composed of alluvium or deposited by a stream or running water.

Alluvium: A general term for all deposits resulting from the operations of modern rivers and creeks, including the sediments laid down in riverbeds, floodplains, and fans at the foot of mountain slopes.

Ambient Air Quality Standard: An established concentration, exposure time, and frequency of occurrence of air contaminant(s) in the ambient air that shall not be exceeded.

Ambient Level: The existing level of air pollutants, noise, or other environmental factors used to describe background conditions (i.e., conditions before a project is implemented).

Analysis area: The area, defined for each resource, which the impact analysis addresses. The analysis boundary is different for each resource. For instance, the impact to soils or vegetation of a transmission pole may be confined to the structure footprint. The impact to land use may be the entire field in which the structure is placed.

Aquifer: Rock or sediment which is saturated with water and sufficiently permeable to transmit economic quantities of water to wells.

Benthic: of, relating to, or occurring at the bottom of a body of water.

Best Management Practices: A practice or combination of practices that are determined to be the most effective and practicable (including technological, economic, and institutional considerations) means of controlling point and nonpoint pollutants at levels compatible with environmental quality goals.

Big Game: Those species of large mammals normally managed as a sport hunting resource.

Centerline: See reference centerline.

Colluvium: Rock detritus and soil accumulated at the foot of a slope.

Community Noise Equivalent (CNEL): The energy average noise level in dB(A) over a 24-hour period with a 5 decibel penalty assigned to evening noise (7 p.m. to 10 p.m.) and a 10 decibel penalty assigned to nighttime noise (10 p.m. to 7 a.m.).

Conductor: Wires or lines that carry the electrical current in a transmission line.

Cooperative Electric Utility: A utility established to be owned by and operated for the benefit of those using its services.

Corona: Breakdown of the air, for example, on the surface of a high-voltage conductor, to produce air ions

CRP Lands: Farmlands for which a landowner receives an annual payment and cost-share assistance to establish long-term resource conserving covers. Administered by the U.S. Farm Service Agency.

Cultural Resources: Those fragile and nonrenewable remains of human activities, occupations, and endeavors as reflected in sites, buildings, structures, or objects, including works of art, architecture, and engineering.

Cumulative effect: Environmental effects that result from the incremental impact of a Proposed Action in addition to other actions (past, present, or future) in the vicinity. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Current: The flow of electricity. A voltage will always try to drive a current. The size current that is driven depends on the resistance of the circuit.

dB(A): Stands for A weighted decibels. This decibel scale is used to approximate the way human hearing responds more to some frequencies than to others.

Dead end: A point on a distribution line where conductors terminate. A "double dead-end" has conductors terminating from two directions. Jumper wires are used to connect these two sets of conductors.

Dead end: (angle greater than 45°): A transmission line structure that would be used where the line turns at an angle greater than 45°. The structure used in this instance would be a 3 pole dead end.

Dead end: (angle less than 1°): A transmission line structure that would be used where the line turns less than 1°. The structure used in this instance would be a 4 pole dead end.

Direct impact: An effect that results solely from the construction or operation of the Proposed Action.

Easement: a general term for a limited right to make use of a property owned by another party.

Electric fields: Produced by voltages, irrespective of how much current is flowing and indeed whether any current is flowing at all. The electric field is the region around a conductor where a force will be experienced by a charge.

Electric Grid: All parts of an electrical system that are directly connected to each other through alternating current transmission lines. The term used in the industry is "Interconnection."

Electric Transmission Grid: The western grid moves power from many different generating plants to customers and their electric loads.

Electromagnetic interference: high frequency electrical noise that can cause radio and television interference.

Emergent Wetland: Any area of a vegetated wetland where non-woody vegetation (e.g. cattail, grasses, sedges) comprises at least 30 percent areal cover.

Eminent Domain: need description

Emission: The release of air contaminants into the ambient air.

Emission Standard: A requirement established under the federal Clean Air Act which limits the quantity, rate, or concentration of emissions of air contaminants on a continuous basis.

EMFs: Electric and magnetic fields. Sometimes also defined as electromagnetic fields, which usually means the same thing

Environmental effect: Any change that an action may cause in the environment, including biological resources, land use, health and socioeconomic conditions, cultural heritage, geology, and paleontology.

Environmental Justice: Evaluation of potential disproportionately high and adverse impacts on low income and/or minority populations that may result from a Proposed Action.

Ephemeral Drainage: A stream or stream segment that flows only briefly in response to local precipitation and has no base flow.

Erosion: Wearing away of soil and rock by weathering and the actions of surface water, wind, and underground water.

Farmland of Statewide Importance: Land that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Criteria for defining and delineating this land are to be determined by the appropriate State agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

Federal Energy Regulatory Commission (FERC): The federal commission that regulates interstate and wholesale power transactions, including power sales and transmission services, as well as licensing of hydroelectric projects.

Fugitive Dust: A particulate emission made airborne by forces of wind, human activity, or both. Unpaved roads, construction sites, and tilled land are examples of areas that originate fugitive dust.

Heavy angle structure: A transmission line structure that would be used where the line turns between 30° and 45°.

Impact zone: The study area in which data are collected during the baseline study in order to make a determination of the impacts from construction, operation, maintenance, or decommissioning of a proposed facility or associated facility at preferred and reasonable alternative locations.

Indirect impact: An effect that is related to but removed from a Proposed Action by an intermediate step or process.

Insulators: a device made of porcelain or polymer that prevents energized conductors from coming in contact with each other. They also prevent conductors from energizing structures or facilities that are not designed to carry electricity. Bushings are a type of insulator.

Intermittent Stream: A stream that flows in a well-defined channel in response to precipitation and is dry for part of the year.

Kilovolt (kV): 1,000 Volts. The Volt is unit for measuring electrical potential, or "pressure."

Kilovolt ampere (kVA): The practical unit of apparent power, which is 1,000 volt-amperes. The volt-amperes of an electric circuit are the mathematical products of the volts and amperes of the client.

Kilowatt (kW): The electric unit of power equal to 1,000 watts.

Kilowatt-Hour (kWh): The basic unit of electric energy equal to one kilowatt of power supplied to or taken from an electric circuit for one hour.

Lacustrine: Of, relating to, formed in, living in, or growing in lakes.

Lek: A traditional courtship display area attended by male sharp-tailed grouse or sharp-tailed grouse.

Linear facility: An electric transmission line or pipeline covered under Montana's Major Facility Siting Act.

Load: The amount of electric power delivered or required at any specified point or points on a system. Load originates primarily at the power consuming equipment of the customer.

Megawatt (MW): One million watts.

Megawatt-hour (MWh): One thousand kilowatt-hours or one million-watt hours.

Medium angle structure: A transmission line structure that would be used where the line turns between 5° and 30°.

Mesic: Characterized by, relating to, or requiring a moderate amount of moisture.

Milligauss: A unit of measurement for magnetic fields.

Mitigation: An action to avoid, minimize, reduce, eliminate, replace or rectify the impact of a management practice.

Montana Major Facility Siting Act (MFSA): This law governs the siting of most large energy transporting facilities in Montana.

National Environmental Policy Act of 1969 (NEPA): This act requires federal agencies to evaluate the environmental effects of Proposed Actions.

Nitrogen Dioxide (NO_2): A reddish brown gas that is a component of smog.

Nitrogen Oxides (NO_x): A group of compounds containing varying proportions of nitrogen and oxygen.

No Action Alternative: The No Action alternative is required by MEPA regulations implementing NEPA. The No Action alternative provides a baseline for estimating the effects of other alternatives. Where a project activity is being evaluated, the No Action alternative is defined as one where No Action or activity would take place.

Nonattainment: Description of areas of the state not yet in compliance with National Ambient Air Quality Standards.

North American Electric Reliability Council (NERC): Council formed by electric utility industry in 1968 to promote the reliability and adequacy of bulk power supply in utility system of North America. NERC consists of ten regional reliability councils: Alaskan System Coordination Council (ASCC); East Central Area Reliability Coordination Agreement (ECAR); Electric Reliability Council of Texas (ERCOT); Mid-America Interconnected Network (MAIN); Mid-Atlantic Area Council (MAAC); Mid-Continent Area Power Pool (MAPP); Northeast Power Coordinating Council (NPCC); Southeastern Electric Reliability Council (SERC); Southwest Power Pool (SPP); Western Systems Coordinating Council (WSCC). **[is this more than we need to know?]**

Noxious Weed: Exotic (non-native) species of plants that proliferate and reduce the value of land for agriculture, forestry, livestock, wildlife, or other beneficial uses.

Operational right of way: MATL defined the transmission line operational right of way as 45 feet wide (22.47 feet to either side of the centerline).

Palustrine: Inland wetland that lacks flowing water and contains less than 0.05 percent ocean-derived salts.

Per capita personal income: According to the U.S. Bureau of Economic Analysis, the average income received per person. This includes income received from all sources such as wages, proprietor's income, rental income, and dividend income.

Personal income (Total): Income received from all sources.

Prime Farmland: Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods.

Reference centerline: The facility location. DEQ approves a 500-foot-wide facility location (250 feet to either side of a presumed centerline unless there is a compelling reason to enlarge or narrow this width.

Right of way: The right to pass over property owned by another. The strip of land over which facilities such as roadways, railroads, pipeline, or power lines are built.

Salmonid: Any of a family (Salmonidae) of elongate bony fishes (as a salmon or trout) that have the last three vertebrae upturned.

Special Status Species: Those species of plants or animals that have a protective status designated by a state or federal agency because of general or localized population decline.

Substation: an installation which accomplishes one or more of the following:

- voltage changed from one level to another level.
- voltage regulated to compensate for system voltage changes.
- electric transmission and distribution circuits switched into and out of the system.
- electric power flowing in the transmission and distribution circuits measured.
- communication signals are connected to the circuits.

System reliability: the ability of a power system to provide uninterrupted service.

Tertiary: The Tertiary period or system of rocks.

Topsoil: Fertile soil or soil material, usually rich in organic matter, used to top dress disturbed areas. Topsoil is better suited to supporting plants than other materials.

Total Maximum Daily Load (TMDL): The total amount of a pollutant, per day, (including a margin of safety) that a waterbody may receive from any source (point, nonpoint, or natural background) without exceeding the state water quality standards. The term frequently refers to a plan or strategy to return a waterbody to compliance with the water quality standards and therefore fully supporting of its designated uses.

Transmission capacity: the maximum load that a transmission line or network of transmission lines is designed to carry.

Transmission lines: High voltage electric conductors used for bulk movement of large volumes of power across relatively long distances.

Transmission restricted: the existing transmission capability is limiting the flow of electricity into and out of the area, in this case, Montana.

Utility: A regulated entity which exhibits the characteristics of a natural monopoly. For the purposes of electric industry restructuring "utility" refers to the regulated, vertically integrated electric company. "Transmission utility" refers to the regulated owner/operator of the transmission system only. "Distribution utility" refers to the regulated owner/operator of the distribution system which serves retail customers.

Viewshed: The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.

Volatile Organic Compound (VOC): Any of several compounds of carbon that participate in atmospheric photochemical reactions, forming secondary pollutants.

Volt: A unit of electrical pressure. It measures the force or push of electricity. Volts represent pressure, correspondent to the pressure of water in a pipe. A volt is the unit of electromotive force or electric pressure analogous to water pressure in pounds per square inch. It is the electromotive force which, if steadily applied to a circuit having a resistance of one ohm, will produce a current one ampere.

Volt-amperes: The volt-amperes of an electric circuit are the mathematical products of the volts and amperes of the client.

Voltage: Measure of the force of moving energy.

Watt: The electric unit of power or rate of doing work. One horsepower is equivalent to approximately 746 watts.

Watt-Hour: One watt of power expended for one hour.

Western Systems Coordinating Council (WSCC): One of the ten regional reliability councils that make up the North American Electric Reliability Council (NERC).

Wetlands: Areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances, does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Wide Area Augmentation System (WAAS): Augments GPS with additional signals for increasing the reliability, integrity, accuracy and availability of GPS.

Xeric: Characterized by, relating to, or requiring only a small amount of moisture.

Acronym List

ACSR	Aluminum Core Steel Reinforced
AESO	Alberta Electric System Operator
aMW	average megawatts
APLIC	Avian Power Line Interaction Committee
ARM	Administrative Rules of Montana
BLM	U.S. Bureau of Land Management
BPA	Bonneville Power Administration
CAMA	Computer Assisted Mass Appraisal
cfs	Cubic feet per second
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
CO	Carbon monoxide
CRP	Conservation Reserve Program
dBA	A-weighted decibels
DEQ	Montana Department of Environmental Quality
DNRC	Department of Natural Resources & Conservation
DOE	U.S. Department of Energy
EEI	Edison Electric Institute
EIS	Environmental impact statement
EPA	U.S. Environmental Protection Agency
EMF	Electric and magnetic field
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Plan
FERC	Federal Energy Regulatory Commission
ft	feet
ft^2	square feet
ft/day	feet per day
FWP	Montana Department of Fish, Wildlife and Parks
FWS	U.S. Fish and Wildlife Service
GIS	Geographical Information System
GPS	Global Positioning System
HUC	Hydrologic unit codes
HUD	Housing and Urban Development

Kcmil	1,000 circular mils
kV	Kilovolt
kV/m	Kilovolts per meter
kWh	Kilowatt hour
L_{dn}	day-night average noise level
LIDAR	Light Detection and Ranging
mA	Milliampere
MATL	Montana-Alberta Tie, Ltd.
MBMG	Montana Bureau of Mining and Geology
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MFSA	Major Facility Siting Act
mG	Milligauss
MHz	megahertz
MPDES	Montana Pollution Discharge Elimination System
MRMC	Missouri River Medical Center
mVA	Megavolt-amperes
MW	Megawatt
ND	No data
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Council
NESC	National Electric and Safety Code
NHP	Montana Natural Heritage Program
NIEHS	National Institute of Environmental Health Sciences
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRIS	Natural Resource Information System
NWE	NorthWestern Energy
NWR	National Wildlife Refuge
NWS	National Weather Service
OASIS	Open Access Same Time Information System
OSHA	Occupational Safety and Health Act
PAB	Palustrine Aquatic Bed wetlands
Pb	Lead
PEM	Palustrine emergent

PM_{10}	Particulate matter smaller than 10 microns
$PM_{2.5}$	Particulate matter smaller than 2.5 microns
PPL	Pacific Power and Light
ppm	Parts per million
PSD	Prevention of Significant Deterioration
PUB	Palustrine Unconsolidated Bottom wetlands
PUS	Palustrine Unconsolidated Shore wetlands
SHPO	State Historic Preservation Office
SO_2	Sulfur dioxide
SSSA	Soil Science Society of America
SWPPP	Storm Water Pollution Prevention Plan
TBD	To be determined
TMDL	Total maximum daily load
USC	United States Code
WAAS	Wide Area Augmentation System
WAPA	Western Area Power Administration
WECC	Western Electricity Coordinating Council
WPA	Waterfowl Production Area
WRCC	Western Regional Climate Center
$\mu g/m^3$	Micrograms per square meter
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

8.0 Responses to Public Comments

9.0 References

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- Response to Supplemental Information Requests. Montana Alberta Tie Ltd. Project , 230-kV AC Power Transmission Line – Lethbridge, Alberta – Great Falls, Montana. March 16, 2006.
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- Appendix I Updated Tables for Sections 4.3.4, 4.7. April 18, 2006.
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APPENDIX A:
DEQ LOCAL REALIGNMENT SEGMENTS PRELIMINARY ANALYSIS

Development of Alternative 4 (Possible Agency-Proposed Local Realignments)

During the development of Alternative 4, DEQ considered eight possible local realignments to address specific scoping issues (**Figure A1**). The eight local realignments are presented below as segments A1, A2, B1, B2, C1, C2, D, and E. In assembling Alternative 4 as a whole, DEQ selected segments A1, B2, C1, the north half of D, and E. As discussed in Section 2.5, the DEQ Director may select some of the segments included in Alternative 4 as mitigations to address land use and visual resource issues identified during scoping and in the analysis of Alternative 2. Therefore, all of the segment descriptions are included here for information. DEQ's analysis of these segments, and the information that helped in the selection of segments for Alternative 4, are presented here.

West Great Falls Realignment Segment A1

Alternative segment A1 is an alignment that would diverge from the southern 23 miles of Alternative 2, to avoid diagonal crossing of farm land, where possible. Where Alternative 2 would go directly north out of the Great Falls Substation, segment A1 would take a west-northwesterly path out of Great Falls paralleling the railroad and WAPA 230-kV transmission line, making use of an existing transportation corridor. The segment A1 alignment would head west and then north along the railroad and rejoin Alternative 2 where it leaves 8th Road. Segment A1 is the only segment that would run south and west of Benton Lake National Wildlife Refuge.

Shooting Sports Complex Realignment Segment A2

Approximately 1½ miles north of Great Falls, Alternative 2 would turn directly west for a mile and then run directly north along the west side of the Great Falls Shooting Sports Complex. Segment A2 is a 4.2-mile-long alignment that would continue directly north from Great Falls along the edge of cropland and parallel to the access road on the east side of the Great Falls Shooting Sports Complex. The alignment would parallel the existing 161-kV NWE transmission line between Great Falls and Havre. Segment A2 would rejoin Alternative 2 where it crosses Highway 87. This alignment would minimize crossing of farmland.

Diamond Valley Right Angle Realignment Segment B1

Segment B1 is a 5.9-mile-long alignment addressing the area in Teton county 2 to 5 miles south of the Teton River. In the headwaters of Kinnerely Coulee, segment B1 would run directly north where Alternative 2 turns northwest. After running directly north for approximately 2½ miles, segment B1 would turn directly west running approximately 3 miles until it would rejoin Alternative 2 in the vicinity of Hunt Coulee. This alignment would avoid diagonal crossing of farm land.

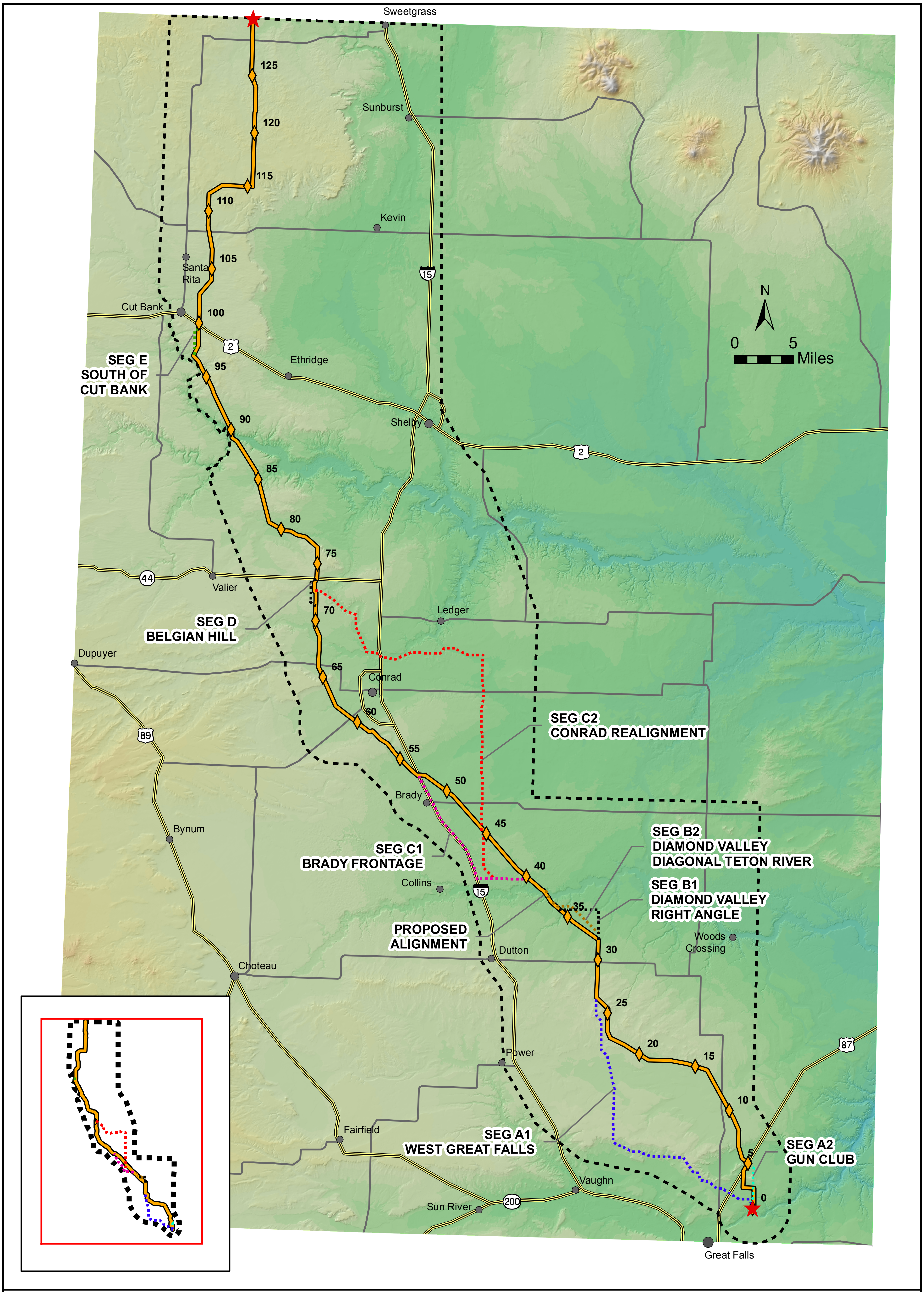
Sweetgrass
125
120
Sunburst
115
110
Kevin
105
Santa Rita
15
N
0
5
Miles
Cut Bank
100
2
SEG E SOUTH OF CUT BANK
95
Ethridge
90
Shelby
2
85
80
75
44
Valier
70
Ledger
SEG D BELGIAN HILL
Dupuyer
65
Conrad
60
89
SEG C2 CONRAD REALIGNMENT
55
50
Brady
45
SEG B2 DIAMOND VALLEY DIAGONAL TETON RIVER
Bynum
SEG C1 BRADY FRONTAGE
40
Collins
15
SEG B1 DIAMOND VALLEY RIGHT ANGLE
35
PROPOSED ALIGNMENT
Woods Crossing
30
Dutton
Choteau
25
20
Power
15
87
10
SEG A1 WEST GREAT FALLS
Fairfield
5
SEG A2 GUN CLUB
Vaughn
0
200
Sun River
Great Falls

FIGURE A1
AGENCY PROPOSED LOCAL REALIGNMENT SEGMENTS

L E G E N D

- ▬ ALT2 - ALIGNMENT
- ◆ ALT2 - MILEPOSTS
- ┅ SEGMENT A1 WEST GREAT FALLS
- ┅ SEGMENT A2 SHOOTING SPORTS COMPLEX
- ┅ SEGMENT B1 DIAMOND VALLEY RIGHT ANGLE
- ┅ SEGMENT B2 DIAMOND VALLEY AND TETON RIVER
- ┅ SEGMENT C1 BRADY FRONTAGE ROAD
- ┅ SEGMENT C2 CONRAD REALIGNMENT
- ┅ SEGMENT D BELGIAN HILL
- ┅ SEGMENT E SOUTH OF CUT BANK
- ● CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- ┅ STUDY AREA BOUNDARY
- ═ MAJOR HIGHWAYS
- ─ SECONDARY ROADS

GIS map by Ed Madej -TTEMI-HE FigA1_MATL_ALT4_Agency_Realignments_021607.mxd

Diamond Valley and Teton River Realignment Segment B2

Segment B2 is a 6.5-mile-long alignment that would diverge from Alternative 2 at the same location as segment B1. Where the segment B2 alignment intersects the Alternative 3 alignment and existing NWE 115-kV transmission line, it would parallel the line for approximately 3 miles until it would turn west to join Alternative 2 just south of the Teton River. Segment B2 would cross Hunt Coulee approximately ¾ mile north of the Alternative 2 crossing and ¼ mile north of the segment B1 crossing. Segment B2 would then cross the Teton River just east of the location described in Alternative 2. Segment B2 would address a landowner concern over opening a new corridor rather than paralleling an existing line which already has disrupted farming practices in some fields.

Brady Frontage Road Realignment Segment C1

Segment C1 is a 15-mile-long realignment that would diverge from Alternative 2 approximately 8 miles southeast of Brady. Segment C1 would run directly west from the Alternative 2 along the northern edge of the Teton River bank to the Interstate 15 frontage road, and follow the frontage road for about 11 miles past the town of Brady to rejoin Alternative 2 about two miles north of Brady. Segment C1 would closely parallel the existing transportation corridor of Interstate 15 and the frontage road. Segment C1 would decrease crossing of farmland and avoid paralleling one pipeline.

Conrad Realignment Segment C2

Segment C2 is a 41-mile-long realignment that would diverge from Alternative 2 at the same location as segment C1. After approximately 3 miles running directly west, segment C2 would turn northwest for approximately 1½ miles, then turn directly north for approximately 18 miles, then turn directly west, heading for the Dry Fork of the Marias River. After the alignment crosses the existing WAPA 230-kV transmission line, approximately 2 miles south of Ledger, it intersects the river. The alignment generally parallels the Dry Fork of the Marias until it would cross Interstate 15, then head northwest along Big Flat Coulee for approximately 8 miles. The alignment would turn due west for approximately 1 mile before rejoining Alternative 2, approximately 4 miles north of the Dry Fork of the Marias River crossing. This segment would minimize diagonal crossing of farm land, avoid crossing farm land by traversing uncultivated land, and avoid residences and paralleling of pipelines.

Belgian Hill Realignment Segment D

Segment D is a 2.8-mile-long realignment that would move the alignment slightly west from the Alternative 2 alignment for 2 miles, just north of Belgian Hill, farther away from four residences (**Figure A2**). The alignment would generally parallel Alternative 2. Segment D would result in greater potential for general local acceptance. This segment would reduce visual impacts. Some diagonal crossing of farmland would be required.

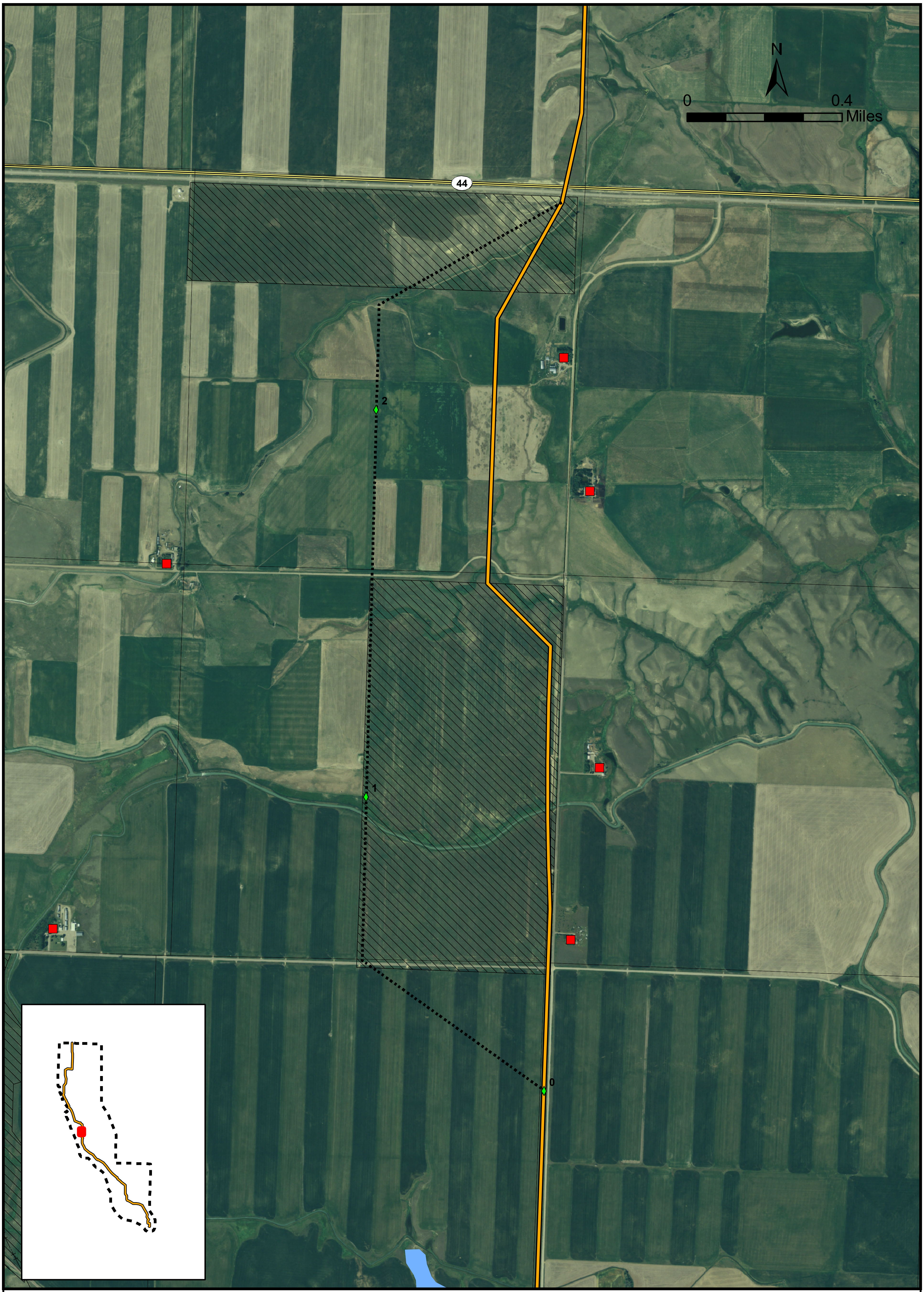

FIGURE A2
SEGMENT D
BELGIAN HILL

LEGEND

- ALT2 - ALIGNMENT
- SEGMENT D BELGIAN HILL
- MILEPOSTS
- RESIDENCES OR FARMSTEADS WITHIN 1 MILE OF ALIGNMENTS

EASEMENTS

- ▨ CONSERVATION RESERVE PROGRAM

- ■ CITIES AND TOWNS
- ★ ALIGNMENT END AND EXIT POINTS
- STUDY AREA
- EXISTING TRANSMISSION LINES
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

GIS map by Ed Madej TTEMI-HE FigA2_MATL_Alt4_SegD_021507.mxd

South of Cut Bank Realignment Segment E

Segment E is a 2.5-mile-long realignment that would move the alignment approximately ¼ mile west for a 2-mile stretch, just south of the Alternative 2 intersection with Highway 2. Segment E would move the alignment to follow property boundaries better and is located farther away from residential areas and result in greater potential for general local acceptance. Segment E would generally parallel Alternative 2.

Land Use Segment Analysis

Table A1 shows how many miles of cropland and CRP would be crossed by each agency-proposed local realignment segment in comparison to the same segment of Alternative 2.

TABLE A1
AGENCY SEGMENT CROPLAND COMPARISON
TO ALTERNATIVE 2 SEGMENTS

	Linear Miles	**Acres in 500-Foot Wide Buffer**	**Miles Crossing CRP or Cropland**
Segment A1 **(West Great Falls)**	**27.3**	1,652	11.7
Alternative 2 Corresponding segment	**26.8**	1,621	17.2
Segment A2 **(Shooting Sports Complex)**	**4.2**	255	2.4
Alternative 2 Corresponding segment	**5.0**	301	2.4
Segment B1 **(Diamond Valley Right Angle)**	**5.9**	357	5.4
Alternative 2 Corresponding segment	**4.2**	256	3.7
Segment B2 **(Diamond Valley & Teton River)**	**6.5**	393	5
Alternative 2 Corresponding segment	**5.9**	358	5.2
Segment C1 **(Brady Frontage)**	**15.0**	904	9.3
Alternative 2 Corresponding segment	**13.3**	804	12.6
Segment C2 **(Conrad Realignment)**	**41.0**	2,481	28.3
Alternative 2 Corresponding segment	**33.0**	1,999	27.5
Segment D **(Belgian Hill)**	**2.8**	170	2.8
Alternative 2 Corresponding segment	**2.4**	73	2.2
Segment E **(South of Cut Bank)**	**2.5**	149	0
Alternative 2 Corresponding segment	**2.3**	140	.7

Notes: Alternative 4 would require the use of monopole on cropland or CRP. The overall Alternative 2 alignment crosses 92.7 miles of cropland and CRP.

Table A2 shows the types of land use crossed by Alternatives 2 and 3, and how many miles of farm land are crossed parallel to farming rows, perpendicular to farming rows, or at a diagonal to farming rows.

TABLE A2
TYPES OF LAND USE CROSSED BY ALTERNATIVES 2 AND 3 (MILES)

	Alternative 2				Alternative 3			
	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total
Irrigated cropland	1.4	0	0.1	1.5	0	0	6.8	6.8
Non-irrigated cropland	34.5	3.9	52.8	91.2	27.3	0	63.6	90.9
Rangeland	6.3	1.8	25.5	33.6	5.2	0.2	16.2	21.6
Road/Right of Way	0.2	0.9	0.2	1.3	0.1	0	0.2	0.3
Residential	0	0	0	0	0	0	0.1	0.1
Forest	0	0	0	0	0	0	0.1	0.1
Riparian	0.6	0	1.3	1.9	0.1	0	1.2	1.3
Water	0	0	0	0	0	0	0.1	0.1
Total Miles	43.0	6.6	79.9	129.5	32.7	0.2	88.3	121.2

Notes:

[a] parallel to north and south

[b] perpendicular to north and south

[c] diagonal to north and south

Sources: Orthophotographs 2005 (Montana NRIS 2006a); NRIS 2000; MATL 2006b; field verification; photographic interpretation

The agency-proposed local realignment segments were developed, in part, to reduce the impacts on farming from the proposed transmission line. The numbers of miles of crossings parallel to, perpendicular to, and diagonal to irrigated cropland, non-irrigated cropland, and rangeland are summarized for corresponding segments of Alternative 2 and agency-proposed local realignments (**Table A3**).

TABLE A3
MILES OF PARALLEL, PERPENDICULAR, AND DIAGONAL ACROSS CROPLAND AND RANGELAND ALTERNATIVE 2 AND CORRESPONDING AGENCY LOCAL REALIGNMENT SEGMENT

	Alternative 2				Agency-proposed Local Realignment Segment			
	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total
Segment A1 — West Great Falls								
Irrigated	--	--	--	--	--	--	--	--
Non-irrigated	5.4	1.0	10.8	17.2	6.6	1.6	3.5	11.7
Rangeland/ Native	1.0	1.0	6.5	8.5	1.9	2.7	10.7	15.3
Other	0	0.9		0.9	0.1	--	0.1	0.2
Total Miles	**6.4**	**2.9**	**17.3**	**26.6**	**8.6**	**4.3**	**14.3**	**27.2**
Segment A2 — Great Falls Shooting Sports Complex								
Irrigated	-	-	-	-	-	-	-	-
Non-irrigated	1.7	0.5	0.2	2.4	1.7	0.1	0.6	2.4
Rangeland/ Native	1.1	0.0	0.7	1.8	1.1	--	0.7	1.8
Other	0.0	0.0	0.0	0.0	--	--	--	--
Total Miles	**2.8**	**0.5**	**0.9**	**4.2**	**2.8**	**0.1**	**1.3**	**4.2**
Segment B1 — Diamond Valley Right Angle								
Irrigated	--	--	--	--	--	--	--	--
Non-irrigated	--	--	3.7	3.7	2.5	2.9	--	5.4
Rangeland/ Native	--	--	0.3	0.3	--	0.4	--	0.4
Other	--	--	--	--	--	0.1	--	0.1
Total Miles	**--**	**--**	**4.0**	**4.0**	**2.5**	**3.4**	**--**	**5.9**
Segment B2 — Diamond Valley Diagonal-Teton River								
Irrigated	0.0	0.0	0.0	0.0	-	-	-	-
Non-irrigated	0.0	0.0	5.2	5.2	0.5	0.8	3.7	5.0
Rangeland/ Native	0.0	0.0	0.8	0.8	0.2	0.5	0.7	1.4
Other	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.1
Total Miles	**0.0**	**0.0**	**6.2**	**6.2**	**0.7**	**1.3**	**4.5**	**6.5**
Segment C1 — Brady Frontage								
Irrigated	--	--	--	--	--	--	--	--
Non-irrigated	--	0.5	12.1	12.6	--	3.8	5.5	9.3
Rangeland/ Native	--	0.1	0.6	0.7	--	0.8	0.0	0.8
Other	--	--	0.2	0.1	--	--	4.9	4.9
Total Miles	**--**	**0.6**	**12.9**	**13.4**	**--**	**4.6**	**10.4**	**15.0**

TABLE A3
MILES OF PARALLEL, PERPENDICULAR, AND DIAGONAL ACROSS CROPLAND AND RANGELAND ALTERNATIVE 2 AND CORRESPONDING AGENCY LOCAL REALIGNMENT SEGMENT

	Alternative 2				Agency-proposed Local Realignment Segment			
	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total
Segment C2 — Conrad Realignment								
Irrigated	0.9	--	0.0	0.9	1.2	0.5	-	1.7
Non-irrigated	3.3	--	23.2	26.6	14.8	6.5	5.3	26.6
Rangeland/ Native	0.6	--	3.9	4.5	1.1	1.2	9.8	12.1
Other	0.1	--	0.9	0.9	0.2	-	0.4	0.6
Total Miles	**4.9**	**0.0**	**28.0**	**32.9**	**17.3**	**8.2**	**15.5**	**41.0**
Segment D — Belgian Hill								
Irrigated	0.4	--	--	0.4	--	--	--	--
Non-irrigated	1.0	--	0.6	1.6	2.8	--	--	2.8
Rangeland/ Native	0.2	--	0.1	0.1	--	--	--	--
Other	0.1	--	--	0.1	--	--	--	--
Total Miles	**1.7**	**0**	**0.7**	**2.4**	**--**	**--**	**--**	**2.8**
Segment E — South of Cut Bank								
Irrigated	--	--	--	--	--	--	--	--
Non-irrigated	0.7	--	--	0.7	--	--	0	--
Rangeland/ Native	0.8	--	0.8	0.8	2.4	--	--	2.4
Other	--	--	--	0	--	--	--	--
Total Miles	**1.5**	**0**	**0.8**	**1.5**	**--**	**--**	**--**	**2.4**

Notes:

[a] parallel to north and south

[b] perpendicular to north and south

[c] diagonal to north and south

-- Not applicable

Sources: Orthophotographs 2005 (Montana NRIS 2006a); MATL 2006b; field verification; photographic interpretation .

The following observations were made:

- Segment A1 (West Great Falls) is 0.6 miles longer than the segment it would replace in Alternative 2, however, it reduces the diagonal crossing of cropland from 10.8 miles to 3.5 miles.
- Segment A2 (Great Falls Shooting Sports Complex) increases the diagonal crossing of non-irrigated cropland from 0.2 in Alternative 2 to 0.6 miles in Alternative 4.
- Segment B1 (Diamond Valley Right Angle) is 1.9 miles longer than the segment it would replace in Alternative 2, however, it eliminates diagonal crossing of cropland, compared to 3.7 miles of diagonal crossing in Alternative 2 for this segment and moves the transmission line alignment onto existing utility corridors or other land uses (non-farm).
- Segment B2 (Diamond Valley Diagonal - Teton River) is 0.3 miles longer than the segment of Alternative 2 it would replace, but it reduces the diagonal crossing of cropland from 5.2 miles to 3.7 and shifts the crossing to parallel (0.5 miles) or perpendicular (0.8 miles).
- Segment C1 (Brady Frontage) is 1.6 miles longer than the segment it would replace in Alternative 2. It would reduce the diagonal crossing of cropland from 12.1 miles to 5.5 miles.
- Segment C2 (Conrad Realignment) is nearly 8 miles longer than the segment of Alternative 2 it would replace (41 miles compared to 32.9 miles), however, it would substantially reduce the diagonal crossing of cropland from 23.2 miles to 5.3 miles. Most (14.8 miles) of the cropland crossed would be parallel to the north-south orientation of crop rows. Approximately 6.5 miles would be crossed perpendicular to the rows. Additionally, more of the alignment (12.1 miles) would cross native vegetation or rangeland, compared to Alternative 2 which has 4.5 miles crossing those vegetation types.
- Segment D (Belgian Hill) is 0.4 miles longer than the segment it would replace in Alternative 2, however, it would remove all the diagonal crossing of cropland in this segment and increase the distance of parallel crossing from 1.4 miles to 2.8 miles. The parallel crossings or alignment near the edges of the fields would not interfere with farming activities as much as diagonal crossings.
- Segment E (South of Cut Bank) is 0.9 miles longer than the segment it would replace in Alternative 2, however, it would remove all crossings of cropland (including diagonal) and move the alignment onto native or rangeland vegetation.

Table A4 compares how many miles of transmission line cross CRP land or cropland under each agency-proposed local realignment segment and how many acres would be affected. Segments B1, C2, and D would result in a slight increase in acres removed from production because of the longer length of the line under these segments (see **Table A4)**.

TABLE A4
Acres of Production in CRP or Cropland Affected by Monopole Structures in Agency-proposed Local Realignments Compared to Alternative 2

	Alternative 2		Agency-proposed Local Realignment	
Segment	**Miles**	**Acres**[a]	**Miles**	**Acres**[a]
A1 West Great Falls	17.2	1.8	11.7	1.2
A2 Great Falls Shooting Sports Complex	2.4	0.3	2.4	0.3
B1 Diamond Valley Right Angle	3.7	0.4	5.4	0.6
B2 Diamond Valley Diagonal-Teton River	5.2	0.5	5.0	0.5
C1 Brady Frontage	12.6	1.3	9.3	1.0
C2 Conrad Realignment	27.5	2.8	28.3	3.0
D Belgian Hill	2.0	0.2	2.8	0.3
E South of Cut Bank	0.7	0.1	0.0	0.0

Notes:

[a] Acres rounded to nearest 0.01. Calculation based on 0.01 acres per structure at a structure every 500 feet (10.5 structures per mile)

Sources: Orthophotographs, 2005 (Montana NRIS 2006a), NRIS 2000, MATL 2006b; field verification; photographic interpretation

Some segments (B1 - Diamond Valley Right Angle, C1 – Conrad Realignment and D - Belgian Hill) increase the length of power line crossing farmland and CRP slightly (see **Table A4**) over Alternative 2 for those segments.

Conservation Easements and Special Management Areas

Linear miles of lands under federal/state special management and those lands currently under federal or state conservation easements (wetland easements, CRP, and FWP easements) are summarized in **Table A5** for each alignment. Segments A1 and A2 would eliminate crossing the Great Falls Shooting Sports Complex. Some agency-proposed local realignments would increase the number of miles crossing CRP over corresponding Alternative 2 segments they would replace.

TABLE A5
MILES OF FEDERAL/STATE SPECIAL MANAGEMENT AREAS AND CONSERVATION EASEMENTS CROSSED

	Alternative 2 Corresponding Segment	Alternative 3	Agency-proposed Local Realignments
State Land (FWP) – Great Falls Shooting Sports Complex			
Segment A1 (West Great Falls)	0.73	--	0
Segment A2 (Great Falls Shooting Sports Complex)	0	0.51	0.76
Segment B1 (Diamond Valley Right Angle)	--	--	--
Segment B2 (Diamond Valley Diagonal-Teton River)	--	--	--
Segment C1 (Brady Frontage)	--	--	--
Segment C2 (Conrad Realignment)	--	--	--
Segment D (Belgian Hill)	--	--	--
Segment E (South of Cut Bank)	--	--	--
Montana State Trust Land (DNRC)			
Segment A1 (West Great Falls)	3.69	--	2.56
Segment A2 (Great Falls Shooting Sports Complex)	0.12	--	0.08
Segment B1 (Diamond Valley Right Angle)	0.00	--	0.00
Segment B2 (Diamond Valley Diagonal-Teton River)	1.24	--	1.24
Segment C1 (Brady Frontage)	1.14	--	2.68
Segment C2 (Conrad Realignment)	1.70	--	4.03
Segment D (Belgian Hill)	0.00	--	0.00
Segment E (South of Cut Bank)	0.00	--	0.00
Conservation Easements			
Segment A1 (West Great Falls)	(CRP) 5.32 (Stewardship) 0.12	--	10.04
Segment A2 (Great Falls Shooting Sports Complex)	0.00	--	0.00
Segment B1 (Diamond Valley Right Angle)	0.00	--	0.00
Segment B2 (Diamond Valley Diagonal-Teton River)	1.54	--	1.54
Segment C1 (Brady Frontage)	0.00	--	3.10
Segment C2 (Conrad Realignment)	2.16	--	4.17
Segment D (Belgian Hill)	1.36	--	1.48
Segment E (South of Cut Bank)	1.04	--	0.90

Notes:
-- = not applicable

Planned Land Use

The Segment A1 West Great Falls local alignment crosses the planned Kyles Addition subdivision. No residences are under construction or completed in this subdivision.

Wetlands Segment Analysis

The length of each segment and the wetlands affected by each segment are shown in **Table A6**, along with the length of the corresponding segment of Alternative 2 which it could replace.

TABLE A6
WETLANDS AFFECTED BY SEGMENTS
AGENCY-PROPOSED LOCAL REALIGNMENT

Alternative Comparison	**Segment Length**	**Palustrine PEM**	**Palustrine PUS, PUB, & PAB**	**Lacustrine**	**Riverine**	**Total**
	(miles)	(acres)	(acres)	(acres)	(acres)	(acres)
West Great Falls Segment A1	27.3	13.25	0.43	0.0	0.0	13.68
Corr. Alt. 2 Segment	26.8	15.72	1.07	0.78	0.0	17.57
Great Falls Shooting Sports Complex Segment A2	4.2	0.0	0.13	3.21	0.0	3.34
Corr. Alt. 2 Segment	5.0	4.13	0.0	0.78	0.0	4.91
Diamond Valley Right Angle Segment B1	5.9	<1 Est.	ND	ND	<1 Est.	ND
Corr. Alt. 2 Segment	4.2	<1 Est.	ND	ND	<1 Est.	ND
Diamond Valley Diagonal-Teton River Segment B2	6.5	1-2	ND	ND	2-3	ND
Corr. Alt. 2 Segment	5.9	1-2	ND	ND	2-3	ND
Brady Frontage Segment C1	15.0	0.0	0.0	0.0	0.0	0.0
Corr. Alt. 2 Segment	13.3	10.12	1.98	0.0	0.0	12.10
Conrad Realignment Segment C2	41.0	18.10	2.01	0.0	0.0	20.11
Corr. Alt. 2 Segment	33.0	13.75	1.98	0.0	0.0	15.73
Belgian Hill Segment D	2.8	0.0	0.0	0.0	0.0	0.0
Corr. Alt. 2 Segment	2.4	0.0	0.41	0.0	0.0	0.41
South of Cut Bank Segment E	2.5	0.0	0.0	0.0	0.0	0.0
Corr. Alt. 2 Segment	2.3	0.0	0.0	0.0	0.0	0.0

Notes:

Alt.	Alternative
Corr.	Corresponding
PEM	Palustrine Emergent wetlands
PUS	Palustrine Unconsolidated Shore wetlands
PUB	Palustrine Unconsolidated Bottom wetlands
PAB	Palustrine Aquatic Bed wetlands
Est.	estimated using the 2005 aerial photographs
ND	No Data

Potential impacts to wetlands for all eight local realignment segments were evaluated using the wetland data provided in **Table A6**. Total potential wetlands recorded along each local realignment segment were compared to the total wetlands recorded for the corresponding segment of Alternative 2. The total wetland acres was also segregated into four main wetland categories (2 palustrine classes, 1 lacustrine, and 1 riverine) to better evaluate the types of wetlands that each segment may impact. Total wetland acreage does not include any wetlands that may exist in Teton County for the portion of the segments where no official wetland data currently exist. The 2005 National Agricultural Imagery Program aerial photographs were used to visually identify observable wetlands along the local realignment segments in Teton County and to estimate the approximate number of wetlands for these alignments. Even though the wetland acreage could not be quantified from the aerial photographs, it was determined that no single large wetland or concentration of wetlands existed that could not be spanned using 500 foot span lengths.

Potential impacts to wetlands for the local realignment segments were compared only to the corresponding segments of Alternative 2 for which each could substitute. As was determined for the entire analysis area, the majority of the wetlands along all local realignment segments are classified as palustrine, emergent wetlands (PEM).

Segment A1 (West Great Falls) The A1 segment traverses around the southern and western sides of Benton Lake NWR area and would potentially impact 3.89 fewer acres of wetlands, compared to the corresponding segment of Alternative 2. Several smaller areas with palustrine and lacustrine wetlands exist directly north of Great Falls (Black Horse Lake area) and along the western side of Benton Lake NWR. A1 would impact fewer wetlands primarily because it is located along steeper slopes compared to crossing a more flat bench area. No riverine wetlands are delineated along segment A1 facility location. However, segment A1 crosses the Lake Creek channel in Teton County and could potentially impact a small riverine wetland (possibly about 1 acre) at that location.

Segment A2 (Great Falls Shooting Sports Complex Realignment) This 4.2 mile long segment runs north from the Great Falls 230-kV switch yard along the edge of cropland and parallel to the access road to the Great Falls Shooting Sports Complex. The Segment A2 centerline crosses over an actively used gun club, but would not be located over any existing or planned buildings. The segment A2 facility location would potentially impact 1.57 fewer acres of wetlands compared to the corresponding segment of Alternative 2. The primary difference between these two alignments was that the segment A2 realignment would cross a larger portion of the Black Horse Lake Flat that has been mapped as a lacustrine wetland.

Segment B1 (**Diamond Valley Right Angle)** This 5.9 mile long B1 segment is located in Diamond Valley area of Teton County, approximately 2 to 5 miles south of the Teton River. The types and amounts of wetlands that would be impacted within the 500 foot wide facility location of segment B1 are very similar to those that occur along the 4.2 mile long corresponding Alternative 2 portion. Both segment B1 and the corresponding Alternative 2 centerlines would cross Hunt Coulee; segment B1 would cross this coulee at a straight east to west angle, while the Alternative 2 would cross Hunt Coulee at a southeast to northwest angle. Hunt Coulee has palustrine emergent wetlands (estimated to be less than one acre) and a small area of riverine wetlands (estimated to be less than one acre) in the bottom of the coulee. These wetland areas could be spanned causing minimal impacts to wetlands under both the B1 segment and Alternative 2 alignments.

Segment B2 (Diamond Valley and Teton River) This 6.5 mile long segment B2 is also located in the Diamond Valley area of Teton County, but would utilize the same alignment as Alternative 3 for approximately 3.25 miles where it would parallel the existing NWE 115-kV transmission line. Segment B2 would cross Hunt Coulee approximately ¾ mile north of the Alternative 2 crossing and ¼ mile north of the segment B1 crossing of Hunt Coulee. This alignment would also extend further north and includes a modified crossing of the Teton River that avoids some cropland. The types and amounts of wetlands that would be impacted within the 500 foot wide facility location for segment B2 are very similar to those that occur along the 5.9 mile long corresponding Alternative 2 portion. Both alternative alignments would cross small areas with palustrine emergent wetlands (estimated at one to two acres) and a small area of riverine wetlands (estimated at two to three acres) in the bottom of Hunt Coulee and the Teton River. All wetland areas visually identified on the 2005 aerial photographs for segment B2 could be spanned.

Segment C1 (Brady Frontage Road) Segment C1 is a 15.0 mile long alignment that runs directly east - west along the northern edge of the Teton River bank and then parallels the Interstate 15 frontage road for approximately 11 miles, connecting back with the Alternative 2 alignment just north of Brady, Montana. Segment C1 would potentially impact 12.1 fewer acres of wetlands compared to the Alternative 2 alignment through this area. There are no wetlands of any type mapped along the Brady Frontage Road alignment. Several areas with palustrine wetlands (total of 12.1 acres) exist along the corresponding segment of Alternative 2 through this area.

Segment C2 (Conrad Realignment) Segment C2 is a 41.0 mile long alignment that runs around the Town of Conrad on the east and north sides. Segment C2 takes off from Alternative 2 at the same location as segment C1. Both Alternative C1 and C2 segments would be in the same alignment for approximately 3.25 miles where segment C2 would begin to run north. This alternative alignment would travel north for approximately 20 miles where it would turn west and continue for approximately 18 miles where it would rejoin Alternative 2. This alternative alignment would cross several major coulees (South Pondera, Pondera, Favot, and Big Flat) and the Dry Fork Marias River.

Segment C2 would potentially impact 4.38 more acres of total wetlands compared to the corresponding Alternative 2 alignment through this area. The main reason for the increased number of wetlands crossed by segment C2 is the higher proportion of coulees and unfarmed drainages that were used by this alternative in the avoidance of farmed land. Small areas with palustrine and riverine wetlands exist along most of the major coulees and along the Dry Fork Marias River crossing. Segment C2 also crosses slightly larger and more defined drainages due to its more eastern location. Drainages generally flow west to east in this area and tend to have more defined channels as they flow toward the Missouri River.

Segment D (Belgian Hill) Segment D is a relatively short (2.8 mile) alignment located in the Belgian Hill area. This alternative segment generally parallels Alternative 2, but is located approximately ½ mile to the west. This alignment segment was developed primarily to minimize visual impacts to four residences located along the Alternative 2 alignment. Segment D would potentially impact 0.41 fewer acres of palustrine wetlands compared to Alternative 2 through this locale.

Segment E (South of Cut Bank) Segment E is a relatively short (2.5 mile) segment located in an area southeast of Cut Bank. This alternative segment also parallels the Alternative 2 alignment approximately ½ mile to the west. This alignment segment was developed primarily to minimize visual impacts to residences located along the Alternative 2 alignment and to avoid paralleling a buried gathering pipeline for the oil wells in the local area. There are no mapped wetlands along either segment E or the corresponding Alternative 2 alignment in this locale.

Vegetation Segment Analysis

Rangeland vegetation, such as grassland, improved pasture, seeded grasslands, shrubland, badland, riparian and wetlands, and forested cover types, would be removed by the construction of access roads and structures, and at construction staging areas. Maintenance activities would not likely result in additional ground disturbance. Linear miles of rangeland cover types affected by alternative are presented in **Table A7**. Disturbance resulting from staging areas would be similar for Alternatives 2 and 3.

Agency-proposed local realignment segments total approximately 38.5 miles. The comparable segments of Alternative 2 total almost 20 miles (**Table A8**), nearly doubling the grassland the rangeland cover types under alternative segments. The increased crossing in rangeland cover types would result in more tower structures and access roads, thus increasing rangeland impacts. Disturbance due to maintenance activities would also increase over the life of the project due to increased structure and road placement in rangeland and vegetation (**Table A9**). Disturbance resulting from staging areas would be similar to those of Alternatives 2 and 3.

TABLE A7
Native Vegetation Cover Types Crossed by Alternatives 2, 3, and 4

Rangeland Cover Types	**Alternative 2**		**Alternative 3**		**Agency-proposed Local Realignments**	
	Miles	Total Land Cover (percent)	Miles	Total Land Cover (percent)	Miles	Total Land Cover (percent)[a]
Grassland/ Shrubland	33.6	25.9	21.6	17.8	A1 = 15.3 A2 = 1.8 B1 = 0.4 B2 = 1.3 C1 = 0.8 C2 = 12.0 D = 2.8 E = 2.5	A1 = 56.2 A2 = 42.2 B1 = 7.3 B2 = 19.9 C1 = 5.2 C2 = 29.1 D = 99.0 E = 100.0
Riparian	1.9	1.5	1.3	1.1	A1 = 0.2 A2 = 0.03 B1 = 0.1 B2 = 0.2 C1 = 0.05 C2 = 1.0 D = 0.04 E = 0.0	A1 = 0.7 A2 = 0.7 B1 = 2.2 B2 = 2.8 C1 = 0.3 C2 = 2.3 D = 0.01 E = 0.0
Forest (Cottonwood)	0.0	0.0	0.1	0.1	B2 = 0.04[b]	B2 = 0.6
Total	35.5	27.4	23.0	19.0	--	--
Total Line Length	129.9	--	121.6	--	--	--

Notes:
a Percent of segment..
b Found only in segment B_2
Source: Orthophotographs 2005 (Montana NRIS 2006a) analysis of land cover in vegetation analysis area, October 2006.
-- not applicable

TABLE A8
LINEAR MILES OF VEGETATION CHANGE BETWEEN ALTERNATIVE 2 AND AGENCY-PROPOSED LOCAL REALIGNMENTS

Native Vegetation Cover Types	Alternative 2 (miles)	Agency-proposed Local Realignments (miles)
Rangeland	A1 = 8.5	A1 = 15.3
	A2 = 1.8	A2 = 1.8
	B1 = 0.3	B1 = 0.4
	B2 = 0.8	B2 = 1.3
	C1 = 0.6	C1 = 0.8
	C2 = 4.5	C2 = 12.0
	D = 0.3	D = 2.8
	E = 1.6	E = 2.5
Riparian	A1 = 0.0	A1 = 0.2
	A2 = 0.0	A2 = 0.03
	B1 = 0.2	B1 = 0.1
	B2 = 0.2	B2 = 0.2
	C1 = 0.1	C1 = 0.05
	C2 = 0.8	C2 = 1.0
	D = 0.1	D = 0.04
	E = 0.0	E = 0..0
Forest (Cottonwood)	No Data	B2 = 0.4[a]

Note:

a Found only in segment B_2

Source: Orthophotographs 2005 (Montana NRIS 2006a) of land cover in vegetation analysis area, October 2006

TABLE A9
ESTIMATED ACRES OF DISTURBANCE DUE TO H-FRAME STRUCTURES IN RANGELAND VEGETATION

Rangeland Cover Types	Alternative 2			Agency-proposed Local Realignments		
	Miles[a]	Number of Structures[b]	Acres[c]	Miles	Number of Structures	Acres
Grassland/ Shrubland	18.4	121	0.1	36.9	244	0.2
Riparian	1.4	9	<0.01	1.6	11	<0.01
Total	19.8	130	0.1	38.5	255	0.2

Notes:

a Segment total.

b Average 800-foot span between H-frame structures.

c Based on 36 square feet occupied by an H-frame structure.

Riparian Vegetation

The effects to riparian vegetation from the agency-proposed local realignments would be similar to those of Alternative 2 because both alternatives cross similar amounts of riparian habitat (**Table A9**).

Species of Concern

The effects on species of concern from agency-proposed local realignments would be the same as Alternative 2 because both alternatives cross similar amounts of riparian habitat where these species are likely to occur (**Table A10**).

Weed Control

The agency-proposed local realignments would cross more native vegetation than Alternative 2 (**Table A8**). This increase in land area potentially exposed to disturbance and noxious weed invasion would require greater diligence, expense, and coordination to successfully implement a noxious weed control plan (**Table A9**). The MATL Noxious Weed and Invasive Plant Control Plan (**Appendix C**) would adequately reduce the increased risk of noxious weed spread in the analysis area.

Wildlife Segment Analysis

Big Game Species

Impacts on big game species would not be expected. Pronghorn and mule deer does with fawns could be displaced by activities during late spring and early summer, but disturbance within a given portion of the line would be temporary and animals could easily use adjacent habitat during disturbance periods. Activities would not disturb wintering animals as the construction activities would occur during the spring and summer months. The proposed and alternative transmission line alignments would cross through mule deer winter range and there would be some permanent loss of habitat as a result of structures and access roads (see **Table A10).** This habitat loss would not impact mule deer as this is a minor loss relative to the amount of available habitat within the region.

TABLE A10 MULE DEER WINTER RANGE IMPACTED BY ALTERNATIVES				
MULE DEER WINTER RANGE	Alternative			
	2	3	2 Corresponding to Agency-proposed Local Realignments[a]	Agency-proposed Local Realignment by Segments[b]
Miles of Mule Deer Winter Range Bisected by Transmission Line	Alternative 2 Segment A 19	20	A1 = 1.8 A2 = 1.8 B1 = 0 B2 = 1.0 C1 = 0.67 C2 = 9.3 D = 0 E = 0	A1 = 4.2 A2 = 1.8 B1 = 0.9 B2 = 3.0 C1 = 4.8 C2 = 8.8 D = 0 E = 0

Notes:

a Segment of the Alternative 2 alignment that corresponds with the agency-proposed local realignment segment.

b Agency-proposed local realignment segments that correspond to the Alternative 2 segments.

Threatened and Endangered Segment Analysis

The alternative alignments traverse the known habitat range of four Species of Concern and one federally threatened species. **Table A11** lists the linear miles of special status species' habitat range along each of the two action alternatives and local realignments.

TABLE A11 LINEAR MILES OF SPECIAL STATUS SPECIES' HABITAT RANGE BY ALTERNATIVE AND AGENCY-PROPOSED LOCAL REALIGNMENTS					
Common Name	**State Rank**	**Alternative**			
		2	3	2 Corresponding to Agency-proposed Local Realignments[a]	Agency-proposed Local Realignment by Segments[b]
Black-crowned night-heron	S3B	11.2	9.1	A1 = 11.2 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0	A1 = 2.6 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0
Black-necked stilt	S3, S4B	11.2	9.1	A1 = 11.2 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0	A1 = 2.6 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0

TABLE A11
LINEAR MILES OF SPECIAL STATUS SPECIES' HABITAT RANGE BY ALTERNATIVE AND AGENCY-PROPOSED LOCAL REALIGNMENTS

Common Name	**State Rank**	**Alternative**			
		2	3	2 Corresponding to Agency-proposed Local Realignments[a]	Agency-proposed Local Realignment by Segments[b]
Burrowing owl	S2B	4.2	3.9	A1 = 4.2 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0	A1 = 0 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0
Ferruginous hawk	S2B	6.5	0	A1 = 6.5 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0	A1 = 5.8 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0
Peregrine falcon	S2B	2.5	2.2	A1 = 0 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0	A1 = 0 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0
Total for All species	--	19.9	11.3	A1 = 17.7 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0	A1 = 8.4 A2 = 0 B1 = 0 B2 = 0 C1 = 0 C2 = 0 D = 0 E = 0

Notes:

Source: MTNHP. 2005. GIS Analyses of Element Occurrence Data. Montana Natural Heritage Program, Helena, Montana. Available at: **http://nhp.nris.state.mt.us/mbd**

State: S2 = Imperiled because of rarity, or because of other factors demonstrably making it very vulnerable to extinction throughout its range; B = a state rank modifier indicating breeding status for a migratory species; S3 = vulnerable because of rarity, or found in restricted range even though it may be abundant at some of its locations; S4 = apparently secure, though it may be quite rare in parts of its range, especially at the periphery; S1 = critically imperiled because of extreme rarity, or because of some factor of its biology making it especially vulnerable to extirpation; SH = Historical, known only from records over 50 years ago; may be rediscovered; N = non-breeding.

a Segment of the Alternative 2 alignment that corresponds with the agency-proposed local realignment segment.
b Agency-proposed local realignment segments that correspond to the Alternative 2 segments.

Socioeconomics Segment Analysis

The socioeconomic impacts described above are essentially equal for all of the alternatives and segments with the exception of differences in the estimated property tax revenue available to each affected county depending on the mileage of the line that would ultimately be constructed within each county's jurisdiction (**Table A12**).

Cultural Resources Segment Analysis

The Class 1 cultural resource searches resulted in the identification of three previously recorded sites considered eligible for the NRHP in sections along the agency-proposed local realignment segments. These sites include the Rainbow Dam Road, an historic transmission line, and the Burlington Northern-Santa Fe Railroad. There are 20 sites where NRHP-eligibility has not been determined, is unknown, or is unresolved. This group includes six tipi ring sites, two lithic scatter sites, two prehistoric camp sites, an historic road or trail, five homesteads, two historic irrigation systems, one historic trash dump, and one historic mining site.

Two NRHP-eligible sites, 24CA416 the Rainbow Dam Road and 24CA1040 an historic transmission line just north of the Missouri River, are located in sections containing both segment A1 and segment A2. The sections crossed by segment A1 contains three of the tipi ring sites, the two lithic scatter sites, the two prehistoric camp sites, three of the homesteads, and the historic mining site in the category of undetermined, unknown, or unresolved NRHP eligibility.

There are no previously recorded cultural resource sites in sections along either segment B1 or segment B2.

One section along segment C1 contains one tipi ring site of undetermined NRHP eligibility. Several sections along segment C2 contain two of the tipi ring sites, two of the homesteads, one of the historic irrigation systems, and the one historic trash dump in the category of undetermined, unknown, or unresolved NRHP eligibility.

Two sections along segment D contain the historic road or trail and one of the historic irrigation systems both of undetermined NRHP eligibility. Two sections along segment E contain the NRHP-eligible Site 24GL191, the Great Northern Railroad – now part of the Burlington Northern-Santa Fe.

TABLE A12
TAX BENEFIT ESTIMATES FOR ALTERNATIVES AND SEGMENTS

	Alignment Length (Miles)	Value $/Mi.	Estimated Value in County (BxC)	Class 9 Tax Rate (Valuation Ratio): 12%	Taxable Value (DxE)	Avg. Rural Mill Levy	Property Tax (FxG)
Cascade							
Alternative 2	12.76	$363,284	$4,635,504	0.12	$556,260	0.50412	$280,422
Alternative 3	12.31	$363,284	$4,472,026	0.12	$536,643	0.50412	$270,533
Alternative 4							
Segment A1 - Alt 2	12.75	$363,284	$4,631,871	0.12	$555,825	0.50412	$280,202
Segment A1 - Alt 4	19.8	$363,284	$7,193,023	0.12	$863,163	0.50412	$435,138
Chouteau							
Alternative 2	5.87	$363,284	$2,132,477	0.12	$255,897	0.43959	$112,490
Alternative 3	10.21	$363,284	$3,709,130	0.12	$445,096	0.43959	$195,660
Alternative 4							
Segment A1 - Alt 2	5.87	$363,284	$2,132,477	0.12	$255,897	0.43959	$112,490
Segment A1 - Alt 4	0	$363,284	$0	0.12	$0	0.43959	$0
Glacier							
Alternative 2	40.41	$363,284	$14,680,306	0.12	$1,761,637	0.53745	$946,792
Alternative 3	37.34	$363,284	$13,565,025	0.12	$1,627,803	0.53745	$874,863
Alternative 4	40.41	$363,284	$14,680,306	0.12	$1,761,637	0.53745	$946,792
Pondera							
Alternative 2	45.69	$363,284	$16,598,446	0.12	$1,991,814	0.52162	$1,038,970
Alternative 3	44.44	$363,284	$16,144,341	0.12	$1,937,321	0.52162	$1,010,545
Alternative 4							
Segment C1 - Alt 2	4.11	$363,284	$1,493,097	0.12	$179,172	0.52162	$93,460
Segment C1 - Alt 4	7.12	$363,284	$2,586,582	0.12	$310,390	0.52162	$161,906
Segment C2 - Alt 2	28.86	$363,284	$10,484,376	0.12	$1,258,125	0.52162	$656,263
Segment C2 - Alt 4	34.66	$363,284	$12,591,423	0.12	$1,510,971	0.52162	$788,153

TABLE A12
TAX BENEFIT ESTIMATES FOR ALTERNATIVES AND SEGMENTS

	Alignment Length (Miles)	Value $/Mi.	Estimated Value in County (BxC)	Class 9 Tax Rate (Valuation Ratio): 12%	Taxable Value (DxE)	Avg. Rural Mill Levy	Property Tax (FxG)
Teton							
Alternative 2	25.16	$363,284	$9,140,225	0.12	$1,096,827	0.4991	$547,426
Alternative 3	17.32	$363,284	$6,292,079	0.12	$755,049	0.4991	$376,845
Alternative 4							
Segment A1 - Alt 2	8.13	$363,284	$2,953,499	0.12	$354,420	0.4991	$176,891
Segment A1 - Alt 4	7.47	$363,284	$2,713,731	0.12	$325,648	0.4991	$162,531
Segment C1 - Alt 2	4.12	$363,284	$1,496,730	0.12	$179,608	0.4991	$89,642
Segment C1 - Alt 4	7.89	$363,284	$2,866,311	0.12	$343,957	0.4991	$171,669
Segment C2 - Alt 2	4.12	$363,284	$1,496,730	0.12	$179,608	0.4991	$89,642
Segment C2 - Alt 4	6.29	$363,284	$2,285,056	0.12	$274,207	0.4991	$136,857
Notes:							
Sources: Mullen 2006							
Montana Department of Revenue 2004							

Notes:
a Mullen 2006
b Montana Department of Revenue 2004
$/Mi. = dollars per mile

Visuals Segment Analysis

Alternative 4 was developed by comparing eight segments that originated and ended at various locations off of Alternative 2 (**Table A13**). Compared to the corresponding segment from Alternative 2, there are fewer residences in the immediate foreground and foreground (0 to ¼ mile and ¼ to ½ mile) of segments A1, A2, B1, B2, C2, and D compared to the corresponding Alternative 2 segments. The differences are all fewer than 5 residences, except A1 (A1 = 13 and corresponding Alternative 2 A1 = 28). Segment E and the corresponding Alternative 2 segment are the same. Segment C1 has a considerably more residences than the corresponding Alternative 2 segment (C1 = 66 versus corresponding Alternative 2 = 0).

Travel corridor comparison (½ to 1 mile) shows that segments A1, A2, and D have a shorter lineal mileage from the major travel routes in the area than do the corresponding Alternative 2 segments. Segment A1 is approximately 3 miles shorter than its corresponding Alternative 2 segment and the other segments are within 1.5 lineal miles of their corresponding Alternative 2 segments. Segment C1 has a considerable amount more lineal mileage within ½ to 1 mile than the corresponding Alternative 2 segment (C1 = 12.38 miles versus corresponding Alternative 2 C1 = 4.83 miles).

All recreation sites were not compared, but those that were are similar in visual impacts.

In summary, segment A1 has less of a visual impact than the corresponding Alternative 2 segment. The corresponding Alternative 2 segment C1 has considerably smaller visual impact than the segment C1. Transmission line alignments in segments D and E were located in consultation with local residents to reduce visual impacts.

TABLE A13
Comparison of Visual Impacts
Alternative 2, 3, and 4 Segments

Alternative	Segment	Number of Residences (Points)			Recreation – Benton Lake (Miles)	Recreation – State Lands[a] (Miles)	Recreation – Lewis & Clark Trail (Lineal Mileage)			Travel Corridor[b] (Lineal Mileage)
		0 to ¼	¼ to ½	½ to 1	Within One Mile	Miles Crossed	0 to ¼	¼ to ½	½ to 1	½ to 1
2		30	60	91	9.42	0.73	7.94	3.39	6.90	19.61
3		34	71	124	8.90	0.49	7.72	2.30	4.96	21.39
4	A1	10	3	29	--	0.77	0.50	0.52	1.07	4.17
	A2	5	8	4	--	--	--	--	--	2.00
	B1	1	0	2	--	--	--	--	--	--
	B2	2	0	1	--	--	--	--	--	--
	C1[c]	9	57	41	--	--	0.64	0.55	0.89	12.38
	C2[c]	8	16	22	--	--	0.50	0.51	0.79	3.34
	D	4	1	2	--	--	--	--	--	2.50
	E	2	3	3	--	--	0.47	0.50	0.50	1.14
2	A1	9	19	34	--	0.73	0.74	1.15	2.05	7.95
	A2	5	10	13	--	--	--	--	--	3.17
	B1	2	0	1	--	--	--	--	--	--
	B2	2	0	1	--	--	--	--	--	--
	C1	0	0	0	--	--	0.70	1.00	1.38	4.83
	C2	9	20	10	--	--	0.70	1.00	1.38	1.88
	D	4	0	2	--	--	--	--	--	2.45
	E	2	3	4	--	--	--	--	--	1.14

Notes:

a Does not include the conservation easement located north of the Missouri River at Great Falls Substation (Lewis and Clark Greenway Conservation Easement)

b Interstate 15, U.S. Highways 2 and 87, and Montana State Highway 44

c C1 and C2 do not have the same endpoints.

-- not available

APPENDIX B:
TYPES OF H-FRAME STRUCTURES

APPENDIX C:
MATL NOXIOUS WEED CONTROL PLAN

THIS DOCUMENT IS INCLUDED AS APPENDIX N TO THE MATL MFSA APPLICATION

Montana Alberta Tie Ltd.
230-kV Transmission Line Project from Lethbridge, Alberta to Great Falls, Montana

APPENDIX N

Noxious Weed and Invasive Plant Control Plan

DRAFT- June 2006

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Table 1-1 Designated Noxious Weeds of Montana 1

1.0 Introduction

This plan was developed to identify noxious weed and invasive plant control practices that would be implemented for the US portion of the Montana Alberta Tie Ltd (MATL) 230-kV transmission line project from the Canadian border to Great Falls, Montana. A noxious weed is a weed arbitrarily defined by law as being especially undesirable, troublesome, or difficult to control. Invasive plants are alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health (USFR 1999). Equipment and supplies necessary for construction and future operation and maintenance (O&M) activities, and the activities themselves, are possible agents for the spread of noxious and invasive plants (Sheley and others, 1999). Construction and maintenance vehicles can potentially carry seeds into the project area, and from one part of the area to another. The risk of establishing a weed and invasive plant community increases with ground disturbing maintenance activities (Sheley and others, 1999).

Executive Order 13112 requires that each federal agency 1) prevent the introduction and spread of invasive species, 2) detect and respond rapidly to control such species, 3) monitor invasive species populations, and 4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded (USFR 1999). The Montana County Weed Control Act (Title 7, Chapter 22 Part 21) provides for weed management at the county level. The law requires counties to develop a long-term management plan for the control of noxious weeds in their county.

Table 1-1 below provides a summary of the categories of noxious weeds identified in the state of Montana's Weed Management Plan along with each weed's reported distribution within the six project area counties; Glacier, Toole, Pondera, Teton, Cascade and Chouteau Counties.

Table 1-1 Designated Noxious Weeds of Montana

Category 1 – Widespread Noxious Weeds*	
Canada Thistle (*Cirsium arvense*)	Reported in All Project Area Counties
Field Bindweed (*Convolvulus arvensis*)	Reported in All Project Area Counties
Leafy Spurge (*Euphorbia esula*)	Reported in All Project Area Counties
Russian Knapweed (*Centaurea repens*)	Reported in All Project Area Counties
Spotted Knapweed (*Centaurea maculosa*)	Reported in All Project Area Counties
Whitetop or Hoary Cress (*Cardaria draba)*	Reported in All Project Area Counties except Glacier County (historically present)
Diffuse Knapweed (*Centaurea diffusa*)	Reported in Teton, Cascade and Chouteau Counties
Dalmatian Toadflax (*Linaria dalmatica*)	Reported in All Project Area Counties
St. Johnswort (*Hypericum perforatum*)	Reported in Glacier, Cascade and

	Chouteau Counties. Historically present in Teton County.
Sulfur (Erect) Cinquefoil (*Potentilla recta*)	Reported in Glacier, Pondera, Cascade and Chouteau Counties. Historically present in Toole County.
Common tansy (*Tanacetum vulgare*)	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Toole and Pondera Counties.
Ox-eye Daisy (*Chrysanthemum leucanthemum* L.)	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Pondera and Teton Counties.
Houndstongue (*Cynoglossum officinale* L.)	Reported in All Project Area Counties
Yellow toadflax (*Linaria vulgaris*)	Reported in All Project Area Counties
Diffuse Knapweed (*Centaurea diffusa*)	Reported in All Project Area Counties
Category 2 – Established New Invaders*	
Dyers Woad (*Isatis tinctoria*)	Historically present in Pondera and Chouteau Counties, but not currently reported.
Purple Loosestrife or Lythrum (*Lythrum salicaria*, *L virgatum*, and any hybrid crosses thereof).	Reported in Pondera and Cascade Counties. Historically present in Toole County.
Tansy Ragwort (*Senecio jacobea* L)	Not reported in any Project Area County.
Meadow Hawkweed Complex (*Hieracium pratense*, *H. floribundum*, *H. piloselloides*)	Historically present in Pondera and Chouteau Counties.
Orange Hawkweed (*Hieracium aurantiacum* L.)	Not reported in any Project Area County.
Tall Buttercup (*Ranunculus acris* L.)	Reported in Glacier County. Historically present in Teton County.
Tamarisk [Saltcedar] (*Tamarix* spp.)	Reported in Cascade and Chouteau Counties. Historically present in Teton County.
Perennial pepperweed (*Lepidium latifolium*)	Reported in Toole, Pondera, Teton, Cascade and Chouteau Counties.
Category 3 – Non-Established New Invaders*	
Yellow Starthistle (*Centaurea solstitialis*)	Not reported in any Project Area County.

Common Crupina (*Crupina vulgaris*)	Not reported in any Project Area County.
Rush Skeletonweed (*Chondrilla juncea*)	Not reported in any Project Area County.
Eurasian watermilfoil (*Myriophyllum spicatum*)	Not reported in any Project Area County.
Yellow flag iris (*Iris pseudacoru)*	Reported in Cascade County.

**As reported in the 2005 update of the Montana Weed Management Plan*

2.0 Plan Purpose

The weed control plan is part of the overall restoration program. The overall goal of the restoration program is to preserve the native plant species, community, and functioning ecosystem within the Project Study Area. The purpose of this weed control plan is to prevent and control the spread of noxious weeds and invasive plants during and following construction of the proposed project. MATL and its contractors will be responsible for carrying out the methods described in this plan. Reasonable alternatives may be substituted or methods employed to the extent agreed upon jointly by MATL and the State Inspector (or DEQ personnel).

The Noxious Weed and Invasive Plant Control Plan will implement preventative measures to keep construction sites within the Project Study Area free of species that are not yet established there but which are known to be pests elsewhere in the region. The Plan will set priorities for the control or elimination of weeds that have already established on the site, according to their actual and potential impacts on native species and communities, particularly on our conservation targets. MATL and its contractors will take action only when careful consideration indicates leaving the weed unchecked will result in more damage than controlling it with available methods. This strategy will be developed in coordination with the BLM, State of Montana and the impacted County Weed Districts (Glacier, Pondera, Teton, Chouteau, and Cascade Counties). The focus of MATL's noxious weed and invasive plant control efforts will be to prevent the spread of new populations resulting from project activities, and to assist landowners in their weed control responsibilities by reducing or eliminating existing infestations in the project area. Without concurrent control of weed infestations by landowners on surrounding lands, weed control efforts in the project area by MATL will likely be unsuccessful.

3.0 Objectives

For the project area, the objectives of noxious weed and invasive plant control are: 1) to acquire information on the occurrence, distribution and abundance of noxious weeds and invasive plants in the project area prior to construction, 2) to reduce or eliminate existing infestations and prevent the spread of new and existing populations of noxious weeds and invasive plants within the project area to the extent feasible for the life of the project following each construction phase, 3) to ensure any populations of rare plants within the project area are not negatively impacted by control activities, and 4) to coordinate and consult with designated BLM, State of Montana and County weed personnel regarding all noxious weed control activities conducted by MATL to ensure compatibility with existing weed control protocol.

4.0 Weed Control Area

The area for noxious weed and invasive plant control (hereafter referred to as the 'weed control area') includes all lands disturbed by construction activities plus a 30-foot buffer area around disturbances. Newly constructed roadways, where needed, are expected to be about 14 feet wide with varying widths of cut and fill slopes. To buffer all disturbed areas it is estimated that the 'weed control area' will consist of an approximately 100-foot corridor along all roadways and tensioning sites that are used for construction, and all lands within 50 feet of each new transmission line structure. MATL will assume responsibility to control noxious and invasive plants in the weed control area.

5.0 Pre-Construction Surveys

Noxious weed and invasive plant inventories in the project area will be conducted by MATL-designated botanists who are familiar with the taxonomic characteristics and typical habitat preferences of noxious weeds and invasive plants. Prior to construction, surveys will be conducted along existing and proposed new roads to be used for the project, structure locations, pulling and tensioning sites, staging and laydown areas, excavated sites, and other construction sites along the ROW. The Project area will be divided into small survey units (e.g., one or more segments between transmission line structures, including transmission line structure locations) and botanists will record all noxious weed and invasive species present within the survey unit.

Relative abundance of each noxious weed and invasive plant will be recorded for the following three zones (including travelways in and out of the three zones):

- Zone 1: Immediately on the existing or proposed disturbed sites (e.g., roadbeds, structure locations, cut/fill slopes);
- Zone 2: within 30 feet of disturbances, and
- Zone 3: in the general area greater than 30 feet from disturbances.

Ground surveys will be conducted in Zones 1 and 2; Zone 3 will receive a reconnaissance-level survey based on what is visible adjacent to the 30 ft buffer. Relative abundance of noxious and invasive plant species found in surveyed areas will be recorded. The project botanist will identify locations of any rare plant species that could potentially be affected by control activities and identify conditions necessary to avoid adverse impacts to these locations.

Maps illustrating noxious weed and invasive species abundances in survey units will be produced at an appropriate scale to assist with monitoring and control activities. Other ancillary thematic layers will also be plotted on the maps to assist with navigation and planning.

The dates of all pre-construction surveys will be coordinated with designated BLM, State of Montana, and weed boards/coordinators in Glacier, Pondera, Teton, Chouteau, and Cascade Counties. It is MATL's intent to conduct the survey at an appropriate time in the growing season to positively identify targeted noxious weeds and invasive species and to establish baseline conditions for future control activities. It is anticipated that the pre-construction survey will occur in late summer 2006.

6.0 Noxious Weed Management

Weeds and invasive species are spread by a variety of means including humans (e.g., workers, hikers and recreationalists, etc.), vehicles, construction equipment, construction and reclamation materials, livestock, and wildlife. Implementation of preventive measures to control the spread of noxious weeds and invasive plants is the most cost-effective management approach.

7.0 Preventive Measures

The following preventive measures would be implemented to prevent the spread of noxious/invasive plants during construction and future O&M activities:

1. Prior to construction, the construction contractor will be trained on methods for cleaning equipment, identification of problem plant species in the project area, and procedures to follow when an invasive or noxious weed is located. To assist in identification, the contractor will be supplied with a list and pictures of noxious and invasive species that may exist within the project area.
2. Prior to any construction disturbance, all known weed populations will be flagged so that they may be avoided.
3. Prior to entering the project area, vehicles and construction equipment will be cleaned (pressure wash or forced air) of all mud, dirt, and plant parts where there is a potential to import weeds. This will be done to remove weed seed that may be attached to this equipment. Washing will occur at designated sites (i.e., construction yards), that include appropriate containment systems.
4. Equipment, materials, and vehicles will be stored at specified work areas or construction yards. All personal vehicles, sanitary facilities, and staging areas will be confined to a limited number of specified weed-free locations to decrease chances of incidental disturbance and spread of noxious weeds and invasive plants.
5. Disturbed areas will be promptly seeded following completion of construction activities to reduce the potential for the spread and establishment of noxious

weeds and invasive plants. Seeding should occur as soon as possible following construction and during the optimal time period. Landowners will be contacted and asked to, if possible, refrain from grazing or moving cattle through populations of noxious weeds and newly planted areas. Only county/state-approved mixtures of certified "weed-free" seed will be used. All other introduced construction materials used for the Proposed Project, such as straw and fill, shall also be weed-free.

6. To limit new or improved accessibility into the area by OHVs and other motorized vehicles, all new access roads undesired or not required for maintenance would be controlled in accordance with management directives of BLM, State of Montana, and private landowners.

8.0 Control Measures

If pesticides are used in the project area, an integrated pest management plan would be developed to ensure that applications will be conducted consistent with BLM and Department of Interior (DOI) policies.

Assuming the project will begin construction in late 2006 or early 2007, MATL will flag all known noxious/invasive plants (for avoidance) prior to the time of construction (e.g., September 2006) to prevent the spread of existing populations found in the designated weed control area. Following construction, annual spraying will begin, likely during the months of May and June; however the potential for fall treatment does exist for some species. Annual spraying will continue as necessary to control noxious/invasive plants in the weed control area for the life of the Proposed Project.

Using the prior years' survey information, annual spraying will be planned by MATL and coordinated with BLM, the State of Montana, and County weed coordinators/boards to ensure spraying will be conducted at the proper growing period, during favorable environmental conditions, and will use the appropriate chemicals to control targeted species. The chemicals used must be approved for use.

Only EPA-registered pesticides will be used. Pesticide use shall be limited to nonpersistent, immobile pesticides and will be applied in accordance with label and application permit directions. Spraying will be conducted using a qualified contractor as deemed appropriate by MATL and in consultation with designated BLM personnel, State of Montana personnel, and County weed coordinators/boards. The applicator used must possess a Montana State Pesticide Applicators License. Rather than broad application, the intent of applying herbicide will be to treat only designated areas.

It is anticipated that most spraying will be conducted using ATV-mounted spray equipment, supported by one or more four-wheel drive pickups equipped with water tanks. Pickups will carry necessary chemicals, fluid pumps, tools, and water to provide a base station for refilling of ATV spray tanks. Spraying infestations within the weed control area will be conducted by ATV, using hand-held spray guns with 25 to 50 foot hoses attached to spray tanks or by using 8 to 12 foot spray booms. The spray booms will be utilized for treating larger areas on roadbeds and on gentle to moderately steep terrain. All spraying equipment shall be calibrated to ensure the proper rate of herbicide is applied.

Following annual spraying, a monitoring survey will be conducted to verify locations of noxious weeds and invasive plants in the project vicinity. These monitoring surveys are expected to occur in the late summer/early fall (August-September) and will be conducted using MATL's-designated botanist personnel in the same manner described for the pre-construction surveys.

9.0 Reporting

Beginning with the fall/winter of 2007 (November 2007 to February 2008), MATL will prepare and submit a status report to designated federal, state and county personnel regarding the previous years' weed control activities. The winter 2007 report will detail baseline conditions regarding the occurrence, distribution, and abundance of listed species located in the project area, weed control activities accomplished to date, and expected activities for the following year. Each subsequent years' report will 1) detail the current status of noxious weed and invasive plant occurrence, distribution and abundance, 2) summarize activities conducted in the project area during previous years, and 3) outline projected activities for the following year. This will include timing of surveys, herbicide treatments, amount and types of chemicals applied, and a list of participants and their activities. These reports will continue annually from winter 2007 for the life of the project, or as required by designated federal, state and county personnel to ensure long-term noxious/invasive plan control measures are met in the weed control area.

10.0 References

Montana Department of Agriculture. 2005. Montana Noxious Weed List. Montana Dept. of Agriculture, Helena, Montana. Available at http://agr.state.mt.us/weedpest/noxiousweedslist2.asp.

Sheley, R.L., Manoukian, M., and G. Marks. 1999. “Preventing Noxious Weed Invasion,” pages 69-72 in, R.L. Sheley and J.K. Petroff, editors. Biology and Management of Noxious Rangeland Weeds. Oregon State University Press, Corvallis, OR.

USFR (U.S. Federal Register). 1999. “Presidential Document, Executive Order 13112. Invasive Species,” Federal Register 64:6183-6186.

APPENDIX D:
DRAFT MATL RECLAMATION AND REVEGETATION PLAN

THIS DOCUMENT IS INCLUDED AS APPENDIX O TO THE MATL MFSA APPLICATION

Montana Alberta Tie Ltd.
230-kV Transmission Line Project from Lethbridge, Alberta to Great Falls, Montana

Appendix O

Revegetation and Reclamation Plan

DRAFT

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1. Overview

As part of its MFSA Application, MATL has prepared a draft Revegetation and Reclamation Plan as Appendix K to the "DEQ Environmental Specifications for Montana Alberta Tie Ltd (MATL)" report. The plan is required to specify, at a minimum, seeding mixtures and rates, and procedures to abide by the requirements of ARM 17.20.1902(10). This rule states that following construction work in rangeland areas, the coverage of desirable perennial plant species shall be 30% or more of that of adjacent rangeland of similar slope and topography the year following revegetation, and 90% or more of the coverage of similar adjacent lands within five years. In forested lands, revegetated land other than that in the right-of-way or permanent access roads will be planted with trees so that after five years the stand density of the adjacent forest will be attained at maturity.

This plan also provides the framework to satisfy any identified landowner specifications for their property, as well as any necessary requirements of the General Permit for Storm Water Discharges Associated with Construction Activity, Montana Department of Natural Resources and Conservation requirements for an easement and construction on State lands, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service and state and county requirements for mitigation associated with construction impacts to waters of the US and the state including streams and wetlands.

2. Objectives

The short term objectives of reclamation are to control erosion and sedimentation, thereby minimizing impacts on adjacent lands and waterways. Properly timed and executed construction practices will mitigate short-term impacts. Long term objectives include erosion and sedimentation control, reclamation of topography, soils and vegetation to a condition equal to that existing prior to disturbance, and reclamation of lands to productive uses consistent with that existing prior to disturbance and applicable land management policies. These objectives will be attained by adherence to practices outlined in the DEQ Environmental Specifications for Montana Alberta Tie Ltd (MATL) document, as well as practices outlined in this reclamation and revegetation plan to the extent feasible (Appendix K to that document). Reasonable alternatives may be substituted or methods employed to the extent agreed upon jointly by MATL and the State Inspector (or DEQ personnel).

3. Reclamation

Clearing, Grading, and Topsoil Handling: Per the standards identified in the "DEQ Environmental Specifications for Montana Alberta Tie Ltd (MATL)" report, soil disturbance and earth moving will be kept to a minimum and will follow typical procedures to minimize impacts and enhance reclamation. In addition, right-of-way clearing shall be kept to the minimum necessary to meet the requirements of the National Electric Safety Code.

The permanent easement and temporary work space (the construction right-of-way) will be sized to provide space for all construction activities including temporary storage of any graded material and salvaged topsoil. To prevent wind erosion and facilitate reclamation, the roots of existing vegetation will be retained in place to the extent practical.

In any areas where topsoil must be temporarily removed, a minimum of 3 inches and a maximum of 12 inches of topsoil will be salvaged. Topsoil is defined as an upper layer of the soil, composed primarily of a mixture of organic matter and mineral matter; it is alive with microscopic and small macroscopic organisms (McKinney and Schoch 2006). Topsoil will not be mixed or stored with spoil material. In addition, topsoil will not be stripped during excessively wet or inordinately windy conditions.

Following any necessary clearing for work space, these areas will be graded as necessary to create a level work surface for the passage of heavy construction equipment and other vehicles. Any areas graded during construction will be re-graded to reestablish pre-disturbance landforms. Every reasonable effort will be made to complete final grading and installation of permanent erosion control measures as soon as practicable following construction. All disturbed areas (including temporary access roads and other ancillary facilities) will be returned to pre-excavation grades with allowance for settling. If any discontinuity between natural topography and re-graded ground results, MATL will undertake additional grading work to smooth the transition zone. The elevation of the re-graded right-of-way will not be lower than the natural grade.

For disturbed areas where topsoil was removed, redistribution depths will vary between 3 and 12 inches depending upon depth of topsoil stripped. Topsoil will not be mixed with spoil material at any time during soil handling operations and to the extent practical only topsoil will be re-spread on the surface. Topsoil from un-stripped areas will not be utilized to cover adjacent disturbances.

In addition:

- All garbage and debris will be removed from the re-graded areas before topsoil is replaced.
- Any excess rock not buried or blended with the natural terrain will be disposed of at an approved location.
- The length of time that topsoil is stored will be minimized based on the proposed construction schedule. Topsoil redistribution will begin immediately after re-grading (weather permitting).

- Replaced topsoil will be left in a roughened condition to discourage wind and water erosion. Additional erosion control and soil stabilization may be required on steeper slopes, on topsoil easily transported by wind, etc.
- If it is necessary to alleviate compaction, rutting or crusting prior to seeding, the replaced topsoil will be worked with a harrow, disc, spring, tooth, chisel plow or similar implement.
- Fertilization is not recommended since soil will only be stockpiled for a short period of time and fertilizer may enhance weed growth.

In addition, agricultural areas occupied during construction will be ripped, as necessary, in order to remediate compaction. This effort will be sufficient to relieve compaction to its actual depth.

4. Revegetation

In general, revegetation will be conducted on the right-of-way and at other disturbed areas (temporary access roads, staging areas) to restore vegetative cover that is similar to pre-construction condition, or if requested, meet any other reasonable landowner requests once site work is completed. Disturbed areas will be reclaimed by appropriate contouring and replanting with an approved seed mix. All seed mixtures will be certified “weed free”. Noxious weeds will be controlled through implementation of a Noxious and Invasive Plant Control Plan (Appendix F to the “DEQ Environmental Specifications for Montana Alberta Tie Ltd (MATL)” report, which will be approved, before construction, by the county weed boards affected by the project bounds.

5. Description of Existing Vegetation

Agriculture dominates land use within the Project Study Area and is interspersed with patches of non-farmland mostly in the form of low to moderately covered grasslands. In upland communities not converted to dryland farming such as rangeland, coulees, and slopes, the dominant grass communities include grama (*Bouteloua* spp.)-needlegrass (*Stipa* spp.) and wheatgrass (*Agropyron* spp.), and wheatgrass-needlegrass (Kuchler 1964). North of Cut Bank toward the Canadian border where the Foothill Grassland and Milk River Pothole Upland ecoregions exist, the natural vegetation is characterized by blue grama grass, wheatgrass, and, to a lesser extent, June grass (*Koelaria* spp.). A variety of shrubs and herbs also occur, but sagebrush (*Artemesia cana* and *Artemesia tridentata*) are most abundant, and on drier sites yellow cactus and prickly pear (*Opuntia* spp.) can be found. Saline areas support alkali grass (*Puccinellia* spp.), wild barley (*Hordeum* spp.), greasewood (*Sarcobatus vermiculatus*), saltwort (*Salicornia rubra*) and Pursh seepweed (*Suaeda calceoliformis*). Land that has been converted from dryland farming into the Conservation Reserve Program (CRP) is dominated by wheatgrass (*Agropyron* spp.), alfalfa (*Medicago* spp.), clover (*Trifolium pratense*) and annual weeds (e.g. *Tragopogon dubius*).

The Marias and Teton rivers support the most significant forested riparian habitats in the Project Study Area. Riparian habitats along the Marias and Teton rivers include oxbow marshes and shrub-dominated terraces, but the defining feature is the cottonwood gallery forest that lines the rivers. Despite the fact that these riparian cottonwood forests have been reduced and fragmented by conversion of the floodplain to irrigated agriculture and pasture, they remain the only significant forested habitat within the Project Study Area. The width of the cottonwood gallery forest varies between 30 and 500 feet.

6. Revegetation Mixtures

Revegetation seed mixtures will be agreed upon by MATL and DEQ personnel prior to any revegetation activities taking place on disturbed areas.

Species Selected: Selection of adapted plant species for revegetation is primarily based on existing species occurrence on adjacent lands, and community compositions. Consideration will also be given to establishment potential, growth characteristics, soil stabilizing qualities, availability of seed, and landowner and agency recommendations. MATL will utilize revegetation mixtures based on inventories and knowledge of vegetative types based on field visits conducted to date, and based on any specific recommendations made by the county weed boards.

Species Composition and Rates: The use of native graminoids will be emphasized throughout much of the project area. If noxious weeds invade revegetated areas, control measures, identified in consultation with the county weed board, would be initiated. If any revegetation is required in riparian areas containing woody plants, MATL will plant native shrubs and trees in these locations.

Final seeding and planting rates and species composition will be determined through consultation with DEQ, county weed board members, and land managers on any public lands crossed. Unless otherwise appropriate, approximately 20 pounds per acre of a mix of grasses and forbs seeds should be planted using the broadcast method. A post-seeding pass with a cultipacker would ensure adequate contact of the seed with the soil.

Reseeding will take place in the first appropriate season (Spring or Fall) after construction and at the landowners' discretion. Seeds are best planted in the spring. Seeds planted in the fall are going to be more susceptible to frost-heave and being eaten by rodents. Weed control is also less effective in the fall. Areas disturbed by the Project that supported native vegetation will be revegetated with native species.

Plant Materials: Typically, plant material dealers providing commercial seed will be encouraged to supply seed of local origin. Seed will be purchased in accordance with pure live seed specifications for seed mixtures, emphasizing the use of weed-free certified seed. All seed will be tested to ensure it is noxious weed-free. Seed certification/testing tags will be submitted to DEQ or the counties if requested. Seed will be utilized within 12 months of testing. Containerized or bare root stock will be utilized for native shrub or tree plantings and local stock will be utilized if available.

Seeding Methods: Soil will be conditioned to prepare a good seedbed., Seed will be broadcast utilizing manually operated bucket spreaders, mechanical seed spreaders, blowers or hydroseeders. Seed will be mixed frequently in spreader hoppers to discourage settling. Seeded areas will be chained, harrowed or cultipacked to cover the seed and provide better seed/soil contact. On any areas of steeper slopes, broadcast seeded or hydroseeded areas will be dozer tracked perpendicular to the slope to provide for better seed germination. When hydroseeding is used, seed and mulch will be sprayed in one application. On small areas of revegetation or inaccessible sites, seed will be covered via hand raking.

Construction schedules and seasonal conditions will impact revegetation activities. Seeding and planting will occur as soon after seedbed preparation as possible, either in the fall or spring. Spring seeding, if required, will be conducted as early as possible to maximize the benefits of spring soil moisture.

Planting Methods: In disturbed areas where native shrub or trees need to be planted, MATL will typically utilize stock located as close to the project area as possible. Topsoil salvaged from construction disturbance (assuming no noxious weeds are present) will also be utilized to help promote the re-establishment of existing plant communities.

Tree and shrub planting procedures will follow guidelines set forth in US Forest Service Reforestation Handbook (See FSH 2409.26b, Chapter 700).

7. Erosion Control

In accordance with requirements of the General Permit for Storm Water Discharges Associated with Construction Activity, erosion and sediment control measures will be implemented at disturbed areas to minimize soil movement and improve the potential for revegetation and help ensure successful reclamation. Prior to construction, MATL will prepare a Storm Water Pollution Prevention Plan as part of the application for a General Permit in order to assess the potential for storm water runoff in the areas surrounding the disturbed sites, identify sources of pollutants from the disturbed sites and identify best management practices or control measures to minimize or eliminate these pollutants from entering any surface waters. Drawings of typical techniques that MATL proposes to utilize during construction to control erosion and sediment load to streams and wetlands are presented in Attachment A of this plan (forthcoming from SNC-Lavalin).

8. Monitoring

Revegetated areas will be monitored for a period of at least five years to identify success of reestablishing vegetative cover. This includes monitoring and controlling any noxious weed introduction as discussed further in MATL's Noxious and Invasive Plant Control Plan (Appendix F to the "DEQ Environmental Specifications for Montana Alberta Tie Ltd"). Monitoring efforts identified in this plan will be coordinated with efforts set forth in Appendix F.

Per requirements of ARM 17.20.1902(10), the coverage of desirable perennial plant species will be reviewed against the standard that the revegetative cover be 30% or more of that of adjacent rangeland of similar slope and topography the year following, and 90% or more of the coverage of similar adjacent lands within five years. At the end of the five years, the vegetative cover will be surveyed and documented, and if at that time it is determined that additional monitoring and control will be necessary, DEQ and the appropriate county weed control board will be consulted to determine a plan of action.

Specifically, qualified specialists (identified by MATL) will complete quantitative monitoring on an annual basis to compare adjacent, undisturbed vegetation to the revegetated areas. Evaluation factors will include percent of total vegetative cover, percent litter cover, percent bare ground, species diversity, species composition, woody plant survival (if planted in that area), and presence of noxious weeds. Areas with poor regeneration will be evaluated to identify what reclamation techniques could be utilized to address the problem (address soil fertility, soil erosion, etc.)

9. Reporting

Beginning with the fall/winter of 2007 (November 2007 to February 2008), MATL will prepare and submit a status report to designated state personnel regarding the previous years monitoring activities. The winter 2007 report will detail baseline conditions regarding typical vegetative cover located in the project area, reclamation and revegetation activities accomplished to date, and expected activities for the following year. Each subsequent years report will 1) detail the current status of vegetative cover, as compared to adjacent land cover, 2) summarize activities conducted in the project area during previous years, and 3) outline projected activities for the following year. This effort will be coordinated with reporting requirements for Appendix F (Noxious and Invasive Plant Control Plan). These reports will continue annually from winter 2007 as required by designated state personnel to ensure long-term revegetative measures are met.

Literature Cited

McKinney, M.L. and R.M. Schoch. 2006. Environmental Science, Systems and Solutions. Third Edition. Available at http://environment.jbpub.com/mckinney/interactive_glossary_showterm.cfm?term=topsoil%20. Accessed 24 May 2006.

APPENDIX E:
DRAINAGES AND WETLAND AREAS THAT WOULD BE AVOIDED

THESE TABLES WERE PRESENTED IN THE MATL MFSA APPLICATION AS TABLES 4.5-7 AND 4.5-12

APPENDIX E-1
DRAINAGES AND WATER BODIES CROSSED NORTH TO SOUTH BY PREFFERED ALTERNATIVE A
MONTANA ALBERTA TIE LTD., LETHBRIDGE, AB – GREAT FALLS, MT

Water body	**River Miles**[1]
Red River	8.00 miles
Fitzpatrick Coulee	8.97 miles
Old Maids Coulee	4.95, 5.06 and 10.09 miles
Marias River	171.23 miles
Bullhead Creek	9.94 miles
Winginaw Coulee	0.22 miles
Ringwald Coulee	0.37 miles
Schultz Creek	21.87 miles
Dry Fork Marias River	27.59 miles
Spring Creek	4.55 miles
Pondera Coulee	95.85 miles
Railroad Coulee	3.75 miles
South Pondera Coulee	16.86, 17.15 and 17.30 miles
Brady Coulee	3.83 miles
Rocky Coulee	16.15 miles
Teton River	96.04 miles
Hunt Coulee	2.17 miles
Kinley Coulee	6.34 miles
Unnamed Stream	1.36 miles
Timber Coulee	16.58 miles
Unnamed Stream	3.11 miles
Huntley Coulee	25.21 miles

[1] Source: Montana Fish, Wildlife, and Parks. River miles listed are the point locations at which the alternative would cross the particular water body. River miles are published as an aid to people using the river for commerce, recreation and emergency services. As one travels upstream, the numbers increase until the last listed mile of the navigation map. If multiple river miles are listed then the alignment crosses that particular water body multiple times.

APPENDIX E-2
LINEAR MILES OF WETLANDS ALONG THE TRANSMISSION LINE ALTERNATIVES
MONTANA ALBERTA TIE, LTD., LETHBRIDGE, AB – GREAT FALLS, MT

	Preferred Alternative A	**Alternative B**	**Alternative C**	*Western Alt. Segment*	*Eastern Alt. Segment*
Wetland Class	**Length (Miles)**	**Length (Miles)**	**Length (Miles)**	*Length (Miles)*	*Length (Miles)*
L2ABF	0.00	0.00	0.00	*0.00*	*0.00*
L2USA	0.00	0.00	0.00	*0.00*	*0.00*
L2USAd	0.00	0.00	0.00	*0.00*	*0.00*
PABF	0.00	0.01	0.00	*0.00*	*0.00*
PABFh	0.09	0.09	0.09	*0.00*	*0.00*
PABFx	0.00	0.00	0.00	*0.00*	*0.00*
PEMA	0.64	0.14	0.39	*0.03*	*0.11*
PEMAd	0.08	0.02	0.02	*0.00*	*0.00*
PEMAh	0.00	0.00	0.04	*0.00*	*0.00*
PEMB	0.09	0.00	0.03	*0.00*	*0.00*
PEMC	0.18	0.39	0.20	*0.15*	*0.14*
PEMCh	0.00	0.03	0.03	*0.00*	*0.00*
PEMF	0.00	0.02	0.00	*0.00*	*0.00*
PEMFh	0.00	0.02	0.00	*0.00*	*0.00*
PSSA	0.00	0.00	0.06	*0.00*	*0.00*
PUBFx	0.00	0.00	0.05	*0.00*	*0.00*
PUSA	0.02	0.00	0.00	*0.00*	*0.02*
PUSAh	0.00	0.00	0.04	*0.00*	*0.00*
R3UBH	0.00	0.03	0.04	*0.00*	*0.00*
R3USC	0.04	0.04	0.00	*0.00*	*0.00*
Total Wetlands	1.14	0.77	0.99	*0.18*	*0.27*
U	106.49	98.77	118.02	*18.32*	*18.13*
No Data	22.26	24.89	17.48	--	*0.01*
Total Length of Alternative	129.89	124.43	136.49	*18.50*	*18.41*

APPENDIX F:
DRAFT DEQ ENVIRONMENTAL SPECIFICATIONS

Draft DEQ Environmental Specifications

The following specifications have been developed by the DEQ for projects receiving a Certificate of Compliance and would become conditions to the Certificate of Compliance if it is approved.

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- DEFINITIONS
- PREFACE
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    - 0.2 Environmental protection
    - 0.3 Contract documents
    - 0.4 Briefing of employees
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    - 0.8 Performance bonds
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APPENDICES
  A. Sensitive areas
    B. Performance bond specifications
    C. Variations in right-of-way width
    D. Areas where construction timing restrictions apply
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    H. Culvert and bridge requirements
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    L. Areas where stockpiling of topsoil, hydro seeding, fertilizing, or mulching is required
    M. Roads to be closed and/or obliterated
    N. Right-of-way management plan
    O. Watersheds and other areas where herbicides are prohibited
    P. Names and addresses of STATE INSPECTOR and Owner's liaison
    Q. Monitoring plan

DEFINITIONS

ACCESS EASEMENT: Any land area over which the OWNER has received an easement or other permission from a LANDOWNER allowing travel to and from the project. Access easements may or may not include access roads.

ACCESS ROAD: Any travel course which is constructed by substantial recontouring of land and which is intended to permit passage by most four-wheeled vehicles.

BEGINNING OF CONSTRUCTION: Any project-related earthmoving or removal of vegetation (except for clearing of survey lines).

BOND: Performance bond to guarantee successful reclamation and revegetation of the project as allowed under 75-20-302(2),MCA

CERTIFICATE: Certificate of Compliance issued by the Department of Environmental Quality.

CONTRACTOR: Constructors of the Facility (agent of owner)

FWP: Montana Fish, Wildlife and Parks

DNRC: Montana Department of Natural Resources and Conservation

DOT: Montana Department of Transportation

DEQ: Montana Department of Environmental Quality

LANDOWNER: The owner of private property or the managing agency for public lands.

OWNER: The owner(s) of the facility, or the owner's agent.

SENSITIVE AREA: Area which exhibits environmental characteristics that may make it susceptible to impact from construction of a transmission facility. The extent of these areas is defined for each project but may include any of the areas listed in Circular MFSA-2 Sections 3.2(1)(d) and 3.4(1).

SHPO: State Historic Preservation Office

STATE INSPECTOR: DEQ employee or DEQ designee with the responsibility for monitoring the OWNER's and contractor's compliance with terms and conditions of the Certificate of Compliance issued for a project.

INTRODUCTION

The purpose of these specifications is to ensure mitigation of potential environmental impacts during the construction, operation and maintenance of a transmission facility.

For non-exempt facilities, the Montana Major Facility Siting Act supersedes all state and local environmental permit requirements except for those dealing with air and water quality, public health and safety, water appropriations and diversions, and easements across state lands (75-20-103 and 401, MCA). A major purpose of these conditions is to ensure that the intent of the laws which are superseded is met, even though the procedures of applying for and obtaining permits from various state agencies are not. As specified later in this document, the STATE INSPECTOR will have the responsibility for arranging reviews and inspections by other state agencies, which would otherwise have been done through a permit application process.

Appendices A through Q refer to the site-specific concerns and areas that apply for a specific project. These addenda, as needed, will be prepared by DEQ working in consultation with the OWNER prior to the start of construction.

0.0 GENERAL SPECIFICATIONS

0.1. SCOPE

These specifications apply to all lands affected by the project. Where the LANDOWNER requests practices other than those listed in these specifications, the OWNER may authorize such a change provided that the STATE INSPECTOR is notified in writing of the change and that the change would not be in violation of: (1) the intent of any state law which is superseded by the Montana Major Facility Siting Act; (2) the Certificate; (3) any conditions imposed by DEQ; (4) DEQ's finding of minimum adverse impact; or (5) the regulations in ARM 17.20.1901 and 17.20.1902.

0.2. ENVIRONMENTAL PROTECTION

The OWNER shall conduct all operations in a manner to protect the quality of the environment and to reduce impacts to the greatest extent practical.

0.3. CONTRACT DOCUMENTS

These specifications shall be part of or incorporated into the contract documents; therefore, the OWNER and the OWNER'S agents shall be held responsible for adherence to these specifications in performing the work

0.4. BRIEFING OF EMPLOYEES

The OWNER shall ensure that the CONTRACTOR and all field supervisors are provided with a copy of these specifications and informed of which sections are applicable to specific procedures. It is the responsibility of the OWNER, its CONTRACTOR and the CONTRACTOR's Construction Supervisors to ensure that the intent of these measures is met. Supervisors shall inform all employees on the applicable environmental constraints spelled out herein prior to and during construction. Site-specific measures spelled out in the appendices attached hereto shall be incorporated into the design and construction specifications or other appropriate contract document.

0.5. COMPLIANCE WITH REGULATIONS

All project-related activities of the OWNER shall comply with all applicable local, state, and federal laws, regulations, and requirements.

0.6. LIMITS OF LIABILITY

The OWNER is not responsible for correction of environmental damage or destruction of property caused by negligent acts of DEQ employees during construction monitoring activities.

0.7. DESIGNATION OF SENSITIVE AREAS

DEQ, in its evaluation of the project, has designated certain areas along the right-of-way or access roads as SENSITIVE AREAS. The OWNER shall take all reasonable actions to avoid adverse impacts in these SENSITIVE AREAS and adopt the measures in Appendix A.

0.8. PERFORMANCE BOND

To ensure compliance with these specifications, the OWNER shall submit to the State of Montana or its authorized agent a BOND or BONDS pertaining specifically to the restoration and revegetation of the right-of-way and adjacent land damaged during construction. Post-construction monitoring by DEQ will determine compliance with these specifications and other mitigating measures included herein. At the time cleanup and restoration are complete, and revegetation is progressing satisfactorily, the OWNER shall be released from its obligation for restoration. At the time the OWNER is released, a portion of this BOND or a separate BOND shall be established by the OWNER and submitted to the State of Montana or its authorized agent. This BOND shall be held for five years or until monitoring by DEQ indicates that reclamation, weed control, and road closures have been adequate. The amount and bonding mechanisms for this section shall be specified by DEQ and agreed to by the OWNER under provisions established by 17.20.1902(9) as specified in Appendix B and attached. Proof of bond shall be submitted to DEQ two weeks prior to the start of construction.

0.9. DESIGNATION OF STRUCTURES

Each structure for the project shall be designated by a unique number on plan and profile maps, and a shape file, route, or geodatabase showing line, structure, and access locations submitted to DEQ. References to specific poles or towers in Appendices A through Q shall use these numbers. If this information is not available because the survey is not complete, station numbers or mileposts shall indicate locations along the centerline. Station numbers or mileposts of all angle points shall be designated on plan and profile maps.

0.10. ACCESS

When easements for construction access are obtained for construction personnel, provision will be made by the OWNER to ensure that DEQ personnel or contractors will be allowed access to the right-of-way and to any off-right-of-way access roads used for construction during the term of the CERTIFICATE. Liability for damage caused by providing such access for the STATE INSPECTOR shall be limited by section 0.6 LIMITS OF LIABILITY.

0.11. DESIGNATION OF STATE INSPECTOR

DEQ shall designate a STATE INSPECTOR or INSPECTORS to monitor the OWNER'S compliance with these specifications and any other project–specific mitigation measures adopted by DEQ as provided in ARM 17.20.1901 through 17.20.1902. The STATE INSPECTOR shall be the OWNER's liaison with the State of Montana on construction, post-construction, and reclamation activities. All communications regarding the project shall be directed to the STATE INSPECTOR. The name of the STATE INSPECTOR can be obtained by contacting the Bureau Chief of the Environmental Management Bureau, Permitting and Compliance Division, Department of Environmental Quality, or the Bureau Chief's successor (see Appendix P).

1.0. PRE-CONSTRUCTION PLANNING AND COORDINATION

1.1. PLANNING

1.1.1. Planning of all stages of construction and maintenance activities is essential to ensure that construction-related impacts will be kept to a minimum. The CONTRACTOR and OWNER shall, to the extent possible, plan the timing of construction, construction and maintenance access and requirements, location of special use sites, and other details before the commencement of construction.

1.1.2. Preferably thirty days, but at least fifteen days before the start of construction, the OWNER shall submit plan and profile map(s) and an electronic equivalent acceptable to the STATE INSPECTOR depicting the location of the centerline and of all construction access roads, maintenance access roads, structures, clearing backlines, and, if known, special use sites. The scale of the map for special use sites shall be 1:24,000 or larger.

1.1.3. If special use sites are not known at the time of submission of the plan and profile, the following information shall be submitted no later than five days prior to the start of construction. The location of special use sites including staging sites, pulling sites, batch plant sites, splicing sites, borrow pits, and storage or other buildings shall be plotted on one of the following and submitted to DEQ: ortho-photomosaics of a scale 1:24,000 or larger, or available USGS 7.5′ plan and profile maps of a scale 1:24,000 or larger, or an electronic equivalent acceptable to the STATE INSPECTOR.

1.1.4. Changes or updates to the information submitted in 1.1.2 and 1.1.3 shall be submitted to DEQ as they become available. In no case shall a change be submitted less than five (5) working days prior to its anticipated date of construction. Changes in these locations prior to construction where designated SENSITIVE AREAS are affected must be submitted to DEQ seven (7) working days before construction and approved by the STATE INSPECTOR prior to construction.

1.1.5. Long-term maintenance routes to all points on the line should be planned before construction begins. Where known, new construction access roads intended to be maintained for permanent use shall be differentiated from temporary access roads on the maps required under 1.1.2 above.

1.2. PRE-CONSTRUCTION CONFERENCE

1.2.1. At least one week before commencement of any construction activities, the OWNER shall schedule a pre-construction conference. The STATE INSPECTOR shall be notified of the date and location for this meeting. One of the purposes of this conference shall be to brief the CONTRACTOR and land management agencies regarding the content of these specifications and other DEQ approved mitigating measures, and to make all parties aware of the roles of the STATE INSPECTOR and of the federal inspectors (if any).

1.2.2. The OWNER's representative, the CONTRACTOR's representative, the STATE INSPECTOR, and representatives of affected state and federal agencies who have land management or permit and easement responsibilities shall be invited to attend the pre-construction conference.

1.3. PUBLIC CONTACT

1.3.1. Written notification by the OWNER's field representative or the CONTRACTOR shall be given to local public officials in each affected community prior to the beginning of construction to provide information on the temporary increase in population, when the increase is expected, and where the workers will be stationed. If local officials require further information, the OWNER shall hold meetings to discuss potential temporary changes. Officials contacted shall include the county commissioners, city administrators, and law enforcement officials. It is also suggested that local fire departments, emergency service providers, and a representative of the Chamber of Commerce be contacted.

1.3.2. The OWNER shall negotiate with the LANDOWNER in determining the best location for access easements and the need for gates.

1.3.3. The OWNER shall contact local government officials, or the managing agency, as appropriate, regarding implementation of required traffic safety measures.

1.4. HISTORICAL AND ARCHAEOLOGICAL SURVEY

1.4.1. The OWNER must develop and carry out a plan submitted to the State Historic Preservation Office (SHPO) that includes steps which have been and will be taken to identify, evaluate, and avoid or mitigate damage to cultural resources affected by the project. The plan (Appendix I) shall include: (1) actions taken to identify cultural resources during initial intensive survey work; (2) an evaluation of the significance of the identified sites and likely impacts caused by the project; (3) recommended treatments or measures to avoid or mitigate damage to known cultural sites; (4) steps to be taken in the event other sites are identified after approval of the plan; and (5) provisions for monitoring construction to protect cultural resources. Except for monitoring, all steps of the plan must be carried out prior to the start of construction. The requirements for this plan should not be construed to exempt or alter compliance by the OWNER or managing agency with 36 CFR 800. This plan must be filed with SHPO.

2.0 CONSTRUCTION

2.1. GENERAL

2.1.1. The preservation of the natural landscape contours and environmental features shall be an important consideration in the location of all construction facilities, including roads, storage areas, and buildings. Construction of these facilities shall be planned and conducted so as to minimize destruction, scarring, or defacing of the natural vegetation and landscape. Any necessary earthmoving shall be planned and designed to be as compatible as possible with natural landforms.

2.1.2. Temporary construction sites and staging areas shall be the minimum size necessary to perform the work. Such areas shall be located where most environmentally compatible, considering slope, fragile soils or vegetation, and risk of erosion. After construction, these areas shall be restored as specified in Section 3.0 of these specifications unless the STATE INSPECTOR authorizes a specific exemption in writing.

2.1.3. All work areas shall be maintained in a neat, clean, and sanitary condition at all items. Trash or construction debris (in addition to solid wastes described in section 2.14) shall be regularly removed during the construction, restoration, and reclamation periods.

2.1.4. In areas where mixing of soil horizons would lead to a significant reduction in soil productivity, increased difficulty in establishing permanent vegetation, or an increase in weeds, mixing of soil horizons shall be avoided insofar as possible. This may be done by removing and stockpiling topsoil, where practical, so that it may be spread over subsoil during site restoration. Known areas where stockpiling of topsoil is required are listed in Appendix L. Prior to construction the STATE INSPECTOR may designate other areas.

2.1.5. Vegetation such as trees, plants, shrubs, and grass on or adjacent to the right-of-way which do not interfere with the performance of construction work or operation of the line itself shall be preserved.

2.1.6. The OWNER shall take all necessary actions to avoid adverse impacts to SENSITIVE AREAS listed in Appendix A. The STATE INSPECTOR shall be notified two working days in advance of initial clearing or construction activity in these areas. The OWNER shall mark or flag the clearing backlines and limits of disturbance in certain SENSITIVE AREAS as indicated in Appendix A. All construction activities must be conducted within this marked area.

2.1.7. The OWNER shall either acquire appropriate land rights or provide compensation for damage for the land area that will be disturbed by construction. The width of the area disturbed by construction shall not exceed a reasonable distance from the centerline as necessary to perform the work. For this project, work should be contained within the area specified in Appendix C.

2.1.8. Flow in a stream course may not be permanently diverted. If temporary diversion is necessary, flow will be restored before a major runoff season or the next spawning season, as determined by the STATE INSPECTOR in consultation with the managing agency.

2.2. CONSTRUCTION MONITORING

2.2.1. The STATE INSPECTOR is responsible for implementing the monitoring plan required by ARM 17.20.1902. The plan specifies the type of monitoring data and activities required, and terms and schedules of monitoring data collection, and assigns responsibilities for data collection, inspection reporting, and other monitoring activities. It is attached as Appendix Q.

2.2.2. The STATE INSPECTOR, the OWNER, and the OWNER'S agents will attempt to rely upon a cooperative working relationship to reconcile potential problems relating to construction in SENSITIVE AREAS and compliance with these specifications. When construction activities would cause excessive environmental impacts due to seasonal field conditions or damage to sensitive features, the STATE INSPECTOR will discuss possible mitigating measures or minor construction rescheduling to avoid these impacts with the OWNER. The STATE INSPECTOR will be prepared to provide the OWNER with written documentation of the reasons for the modifications within 24 hours of their imposition.

2.2.3. The STATE INSPECTOR may require mitigating measures or procedures at some sites beyond those listed in Appendix A in order to minimize environmental damage due to unique circumstances that arise during construction, such as unanticipated discovery of a cultural site. The STATE INSPECTOR will follow procedures described in the monitoring plan when such situations arise.

2.2.4. In the event that the STATE INSPECTOR shows reasonable cause that compliance with these specifications is not being achieved, DEQ would take corrective action as described in 75-20-408, MCA.

2.3. TIMING OF CONSTRUCTION

2.3.1. Construction and motorized travel may be restricted or prohibited at certain times of the year in certain areas. Exemptions to these timing restrictions may be granted by DEQ in writing if the OWNER can clearly demonstrate that no environmental impacts will occur as a result. These areas, listed in Appendix D, include areas deemed as SENSITIVE AREAS.

2.3.2. In order to prevent rutting and excessive damage to vegetation, construction will not take place during periods of high soil moisture when construction vehicles will cause severe rutting.

2.4. PUBLIC SAFETY

2.4.1. All construction activities shall be done in compliance with existing health and safety laws.

2.4.2. Requirements for aeronautical hazard marking shall be determined by the OWNER in consultation with the Montana Aeronautical Division, the FAA, and DEQ. These requirements are listed in Appendix E. Where required, aeronautical hazard markings shall be installed at the time the wires are strung, according to the specifications listed in Appendix E.

2.4.3. Noise levels shall not exceed established DEQ standards as a result of operation of the facility and associated facilities. For electric transmission facilities, the average annual noise levels, as expressed by an A-weighted day-night scale (Ldn) will not exceed 50 decibels at the edge of the right-of-way in residential and subdivided areas unless the affected LANDOWNER waives this condition.

2.4.4. The facility shall be designed, constructed, and operated to adhere to the National Electric Safety Code regarding transmission lines.

2.4.5. The electric field at the edge of the right-of-way will not exceed 1 kilovolt per meter measured 1 meter above the ground in residential or subdivided areas unless the affected LANDOWNER waives this condition, and the electric field at road crossings under the facility will not exceed 7 kilovolts per meter measured 1 meter above the ground.

2.5. PROTECTION OF PROPERTY

2.5.1. Construction operations shall not take place over or upon the right-of-way of any railroad, public road, public trail, or other public property until negotiations and/or necessary approvals have been completed with the managing agency. Roads and trails will be protected and kept open for public use. Where it is necessary to cross a trail with access roads, the trail corridor will be restored. Adequate signing and/or blazes will be established so the user can find the route. All roads and trails designated by government agencies as needed for fire protection or other purposes shall be kept free of logs, brush, and debris resulting from operations under this agreement. Any such road or trail damaged by project construction or maintenance shall be promptly restored to its original condition.

2.5.2. Reasonable precautions shall be taken to protect, in place, all public land monuments and private property corners or boundary markers. If any such land markers or monuments are destroyed, the marker shall be reestablished and referenced in accordance with the procedures outlined in the "Manual of Instruction for the Survey of the Public Land of the United States" or, in the case of private property, the specifications of the county engineer. Reestablishment of survey markers will be at the expense of the OWNER

2.5.3. Construction shall be conducted so as to prevent any damage to existing real property including but not limited to transmission lines, distribution lines, telephone lines, railroads, ditches, and public roads crossed. If such property is damaged by operations under this agreement, the OWNER shall repair such damage immediately to a reasonably satisfactory condition in consultation with the property owner.

2.5.4. In areas with livestock, the OWNER shall make a reasonable effort to comply with the reasonable requests of LANDOWNERs regarding measures to control livestock. Unless requested by a LANDOWNER, care shall be taken to ensure that all gates are closed after entry or exit. The LANDOWNER shall be compensated for any losses to personal property due to construction or maintenance activities. Gates shall be inspected and repaired when necessary during construction and missing padlocks shall be replaced. The OWNER shall ensure that gates are not left open at night or during periods of no construction activity unless the LANDOWNER makes other requests. Any fencing or gates cut, removed, damaged, or destroyed by the OWNER shall immediately be replaced with new materials. Fences installed shall be of the same height and general type as a nearby fence on the same property, and shall be stretched tight with a fence stretcher before stapling or securing to the fence post. Temporary gates shall be of sufficiently high quality to withstand repeated opening and closing during construction, to the satisfaction of the LANDOWNER.

2.5.5. The CONTRACTOR must notify the OWNER, the STATE INSPECTOR, and, if possible, the affected LANDOWNER within two working days of damage to land, crops, property, or irrigation facilities, contamination or degradation of water, or livestock injury caused by the OWNER's construction activities, and the OWNER shall reasonably restore any damaged resource or property or provide reasonable compensation to the affected party.

2.5.6. Pole holes and anchor holes must be covered or fenced in any fields, pastures, or ranges being used for livestock grazing or where a LANDOWNER's requests can be reasonably accommodated.

2.5.7. When requested by the LANDOWNER, all fences crossed by permanent access roads shall be provided with a gate. All fences to be crossed by access roads shall be braced before the fence is cut. Fences not to be gated should be restrung temporarily during construction and restrung permanently within 30 days following construction, subject to the reasonable desires of the LANDOWNER.

2.5.8. Where new access roads cross fence lines, the OWNER shall make reasonable effort to accommodate the LANDOWNER's wishes on gate location and width.

2.5.9. Any breaching of natural barriers to livestock movement by construction activities will require fencing sufficient to control livestock.

2.6. TRAFFIC CONTROL

2.6.1. At least 30 days before any construction within or over any state or federal highway right-of-way or paved secondary highway maintained by DOT, the OWNER will notify the appropriate DOT field office to review the proposed occupancy and to obtain appropriate permits and authorizations. The OWNER must supply DEQ with documentation that this consultation has occurred. This documentation should include any measures recommended by DOT and to what extent the OWNER has agreed to comply with these measures. In the event that recommendations or regulations were not followed, a statement as to why the OWNER chose not to follow them should be included.

2.6.2. In areas where project construction creates a hazard, traffic will be controlled according to the applicable DOT regulations. Safety signs advising motorists of construction equipment shall be placed on major state highways, as recommended by DOT. The installation of proper road signing will be the responsibility of the OWNER.

2.6.3. The managing agency shall be notified, as soon as practicable, when it is necessary to close public roads to public travel for short periods to provide safety during construction.

2.6.4. Construction vehicles and equipment will be operated at speeds safe for existing road and traffic conditions.

2.6.5. Traffic delays will be restricted on primary access routes, as determined by DOT or the managing agency.

2.6.6. Access for fire and emergency vehicles will be provided for at all times.

2.6.7. Public travel through and use of active construction areas shall be limited at the discretion of the managing agency.

2.7. ACCESS ROADS AND VEHICLE MOVEMENT

2.7.1. Construction of new roads shall be the minimum reasonably required to construct and maintain the facility. State, county, and other existing roads shall be used for construction access wherever possible. Access roads intended to be permanent should be initially designed as such. The location of access roads and towers shall be established in consultation with affected LANDOWNERs, and LANDOWNER concerns shall be accommodated where reasonably possible and not in contradiction to these specifications or other DEQ conditions.

2.7.2. All new roads, both temporary and permanent, shall be constructed with the minimum possible clearing and soil disturbance to minimize erosion, as specified in Section 2.11 of these specifications.

2.7.3. Where practical, all roads shall be initially designed to accommodate one-way travel of the largest piece of equipment that will be required to use them; road width shall be no wider than necessary.

2.7.4. Roads shall be located in the right-of-way insofar as possible. Travel outside the right-of-way to enable traffic to avoid cables and conductors during conductor-stringing shall be kept to the minimum possible. Road crossings of the right-of-way should be near support structures.

2.7.5. Where practical, temporary roads shall be constructed on the most level land available. Where temporary roads cross flat land they shall not be graded or bladed unless necessary, but will be flagged or otherwise marked to show their location and to prevent travel off the roadway.

2.7.6. In order to minimize soil disturbance and erosion potential, no cutting and filling for access road construction shall be allowed in areas of up to 5 percent sideslope. In areas of over 5 percent sideslope, road building that may be required shall conform to a 4 percent outslope. The roads shall be constructed to prevent channeling of runoff, and shoulders or berms that would channel runoff shall be avoided.

2.7.7. The OWNER will maintain all permanent access roads, including drainage facilities, which are constructed for use during the period of construction. In the event that a road would be left in place, the OWNER and LANDOWNER may enter into agreements regarding maintenance for erosion control following construction.

2.7.8. Any damage to existing private roads, including rutting, resulting from project construction or maintenance shall be repaired and restored to a condition as good or better than original as soon as possible. Repair and restoration of roads should be accomplished during and following construction as necessary to reduce erosion.

2.7.9. All permanent access road surfaces, including those under construction, will be prepared with the necessary erosion control practices as determined by the STATE INSPECTOR or the managing agency prior to the onset of winter.

2.7.10. Any necessary snow removal shall be done in a manner to preserve and protect roads, signs, and culverts, to ensure safe and efficient transportation, and to prevent excessive erosion damage to roads, streams, and adjacent land.

2.7.11. At the conclusion of line construction, final maintenance will be performed on all existing private roads used for construction access by the CONTRACTOR. These roads will be returned to a condition as good or better than when construction began.

2.7.12. At least 30 days prior to construction of a new access road approach intersecting a state or federal highway, or of any structure encroaching upon a highway right-of-way, the OWNER shall submit to DOT a plan and profile map showing the location of the proposed construction. At least five days prior to construction, the OWNER shall provide the STATE INSPECTOR written documentation of this consultation and actions to be taken by the OWNER as provided in 2.6.1.

2.8. EQUIPMENT OPERATION

2.8.1. During construction, unauthorized cross-country travel and the development of roads other than those approved shall be prohibited. The OWNER shall be liable for any damage, destruction, or disruption of private property and land caused by his construction personnel and equipment as a result of unauthorized cross-country travel and/or road development.

2.8.2. To prevent excessive soil damage in areas where a graded roadway has not been constructed, the limits and locations of access for construction equipment and vehicles shall be clearly marked or specified at each new site before any equipment is moved to the site. Construction foremen and personnel should be well versed in recognizing these markers and shall understand the restriction on equipment movement that is involved.

2.8.3. Dust control measures shall be implemented on access roads where required by the managing agency or where dust would pose a nuisance to residents. Construction activities and travel shall be conducted to minimize dust. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used. Oil or similar petroleum-derivatives shall not be used.

2.8.4. Work crew foremen shall be qualified and experienced in the type of work being accomplished by the crew they are supervising. Earthmoving equipment shall be operated only by qualified, experienced personnel. Correction of environmental damage resulting from operation of equipment will be the responsibility of the OWNER. Repair of damage to a condition reasonably satisfactory to the LANDOWNER, managing agency, or if necessary, DEQ, is required.

2.8.5. Sock lines will be strung using methods that minimize disturbance of soils and vegetation.

2.8.6. Following construction in areas designated by the local weed control board or STATE INSPECTOR as a noxious weed area the CONTRACTOR shall thoroughly clean all vehicles and equipment to remove weed parts and seeds immediately prior to leaving the area.

2.9. RIGHT-OF-WAY CLEARING AND SITE PREPARATION

2.9.1. The STATE INSPECTOR shall be notified at least ten days prior to any timber clearing. The STATE INSPECTOR shall be responsible for notifying the DNRC Forestry Division.

2.9.2. During clearing of survey lines or the right-of-way, shrubs shall be preserved to the greatest extent possible. Shrub removal shall be limited to crushing where necessary. Plants may be cut off at ground level, leaving roots undisturbed so that they may re-sprout.

2.9.3. Right-of-way clearing shall be kept to the minimum necessary to meet the requirements of the National Electric Safety Code. Trees to be saved within the clearing backlines and danger trees located outside the clearing backlines shall be marked. Clearing backlines in SENSITIVE AREAS will be indicated on plan and profile maps. All snags and old growth trees that do not endanger the line or maintenance equipment shall be preserved. In designated SENSITIVE AREAS, the STATE INSPECTOR shall approve clearing boundaries prior to clearing.

2.9.4. In no case should the entire nominal width of the right-of-way be cleared of trees up to the edge, unless approved by the STATE INSPECTOR and the LANDOWNER. Clearing should instead produce a "feathered edge" right-of-way configuration, where only specified hazard trees and those that interfere with construction or conductor clearance are removed. In areas where there is potential for long, tunnel views of transmission lines or access roads as identified in Appendix A, care shall be taken to screen the lines from view. For areas identified in Appendix A, a separating screen of vegetation shall be retained where the right-of-way parallels or crosses highways and rivers.

2.9.5. During construction, care will be taken to avoid damage to small trees and shrubs on the right-of-way that do not interfere with the clearing requirements under 2.9.3. and would not grow to create a hazard over a ten-year period.

2.9.6. Soil disturbance and earth moving will be kept to a minimum.

2.9.7. The OWNER shall be held liable for any unauthorized cutting, injury or destruction to timber whether such timber is on or off the right-of-way.

2.9.8. Unless otherwise requested by the LANDOWNER or managing agency, felling shall be directional in order to minimize damage to remaining trees. Maximum stump height shall be no more than 12 inches on the uphill side or 1/3 the tree diameter whichever is greater. Trees will not be pushed or pulled over. Stumps will not be removed unless they conflict with a structure, anchor, or roadway.

2.9.9. Special logging, clearing, or excavation techniques may be required in certain highly sensitive or fragile areas, as listed in Appendix A.

2.9.10. Crane landings shall be constructed on level ground unless extreme conditions (such as slope, soft, or marshy ground) make other construction necessary. In areas where more than one crane landing per tower site would be built, the STATE INSPECTOR will be notified at least 5 days prior to the beginning of construction at those sites.

2.9.11. No motorized travel on, scarification of, or displacement of talus slopes shall be allowed except where approved by the STATE INSPECTOR and LANDOWNER.

2.9.12. To avoid unnecessary ground disturbance, grounding wires or counterpoise should be placed or buried in disturbed areas whenever possible.

2.9.13. Slash resulting from project clearing that may be washed out by high water the following spring shall be removed and piled outside the floodplain before runoff. Instream slash resulting from project clearing must be removed within 24 hours.

2.9.14. Streamside trees will be felled away from streams rather than into or across streams.

2.10. GROUNDING

Grounding of fences, buildings, and other structures on and adjacent to the right-of-way shall be done according to the specifications of the National Electric Safety Code and any other specifications listed in Appendix G.

2.11. EROSION AND SEDIMENT CONTROL

2.11.1. Clearing and grubbing for roads and rights-of-way and excavations for stream crossings shall be carefully controlled to minimize silt or other water pollution downstream from the rights-of-way. At a minimum, erosion control measures described in the OWNER's Storm Water Control Plan shall be implemented. Sediment retention basins will be installed as required by the STATE INSPECTOR or managing agency.

2.11.2. Roads shall cross drainage bottoms at sharp or nearly right angles and level with the stream bed whenever possible. Temporary bridges, fords, culverts, or other structures will be installed to avoid stream bank damage.

2.11.3. Under no circumstances shall stream bed materials be removed for use as backfill, embankments, road surfacing, or for other construction purposes.

2.11.4. No excavations shall be allowed on any river or perennial stream channels or floodways at locations likely to cause detrimental erosion or offer a new channel to the river or stream at times of flooding.

2.11.5. Installation of culverts, bridges, or other structures in perennial streams along with clearing on stream beds and banks will be done as specified by the STATE INSPECTOR following on-site inspections with DEQ, FWP, and local conservation districts. All culverts shall be installed with the culvert inlet and outlet at natural stream grade or ground level.

2.11.6. Construction of access roads, bridges, fill slopes, culverts, or impoundments, or channel changes within the high-water mark of any perennial stream, lake, or pond, requires consultation with FWP and the local conservation district and application of applicable water quality standards. Within 15 days prior to the start of construction, the OWNER shall submit written documentation that consultation has occurred. Included in this documentation should be the recommendation of the agencies consulted and the actions that OWNER expects to take to completely implement them.

2.11.7. No blasting shall be allowed in streams. Blasting may be allowed near streams if precautions are taken to protect the stream from debris and from entry of nitrates or other contaminants into the stream.

2.11.8. The OWNER shall maintain private roads while using them. All ruts made by machinery shall be filled or graded to prevent channeling. In addition, the OWNER must take measures to prevent the occurrence of erosion caused by wind or water during and after use of these roads. Some erosion-preventive measures include but are not limited to, installing or using cross-logs, drain ditches, water bars, and wind erosion inhibitors such as water, straw, gravel, or combinations of these. Erosion control shall be accomplished as described in the Montana Pollution Discharge Elimination System (MPDES) General Permit for Storm Water Discharges Associated with Construction Activity.

2.11.9. The OWNER shall prevent material from being deposited in any watercourse or stream channel. Where necessary, measures such as hauling of fill material, construction of temporary barriers, or other approved methods shall be used to keep excavated materials and other extraneous materials out of watercourses. Any such materials entering watercourses shall be removed immediately.

2.11.10. The OWNER shall be responsible for the stability of all embankments created during construction. Embankments and backfills shall contain no stream sediments, frozen material, large roots, sod, or other materials that may reduce their stability.

2.11.11. Culverts, arch bridges, or other stream crossing structures shall be installed at all permanent crossings of flowing or dry watercourses where fill is likely to wash out during the life of the road. Culvert or bridge installation is prohibited in areas of important fish spawning beds identified by FWP and during specified fish spawning seasons on less sensitive streams or rivers. All culverts shall be large enough to handle approximately 15-year floods. Culvert size shall be determined by standard procedures taking into account the variations in vegetation and climatic zones in Montana, the amount of fill, and the drainage area above the crossing, and shall be approved as specified in 2.11.6. All culverts shall be installed at the time of road construction and maintained for the life of the project. The areas where stream-crossing measures must be taken are listed in Appendix H.

2.11.12. No fill material other than that necessary for road construction shall be piled within the high water zone of streams where floods can transport it directly into the stream. Excess floatable debris shall be removed from areas immediately above crossings to prevent obstruction of culverts or bridges during periods of high water.

2.11.13. No skidding of logs or driving of vehicles across a perennial watercourse shall be allowed, except via authorized construction roads.

2.11.14. No perennial watercourses shall be permanently blocked or diverted.

2.11.15. Skidding with tractors shall not be permitted within 100 feet of streams containing flowing water except in places designated in advance, and in no event shall skid roads be located on these stream courses. Skid trails shall be located high enough out of draws, swales, and valley bottoms to permit diversion of runoff water to natural undisturbed forest ground cover.

2.11.16. Construction methods shall prevent accidental spillage of solid matter, contaminants, debris, petroleum products, and other objectionable pollutants and wastes into watercourses, lakes, and underground water sources. Secondary containment catchment basins capable of containing the maximum accidental spill shall be installed at areas where fuel, chemicals or oil are stored. Any accidental spills of such materials shall be cleaned up immediately.

2.11.17. To reduce the amount of sediment entering streams, a strip of undisturbed vegetation will be provided between areas of disturbance (road construction or tower construction) and stream courses, and around first order or larger streams that have a well-defined stream course or aquatic or riparian vegetation, unless otherwise required by the LANDOWNER. Buffer strip width is measured from the high water line of a channel and will be determined by the STATE INSPECTOR and managing agency. When braided streams with more than one discernible channel (ephemeral or permanent) are encountered, the high water line of the outermost channel shall be used. In the event that vegetation cannot be left undisturbed, structural sediment containment, approved by the STATE INSPECTOR, must be substituted before soil-disturbing activity commences.

2.11.18. When no longer needed, all temporary structures or fill installed to aid stream crossing shall be removed and the course of the stream reestablished to prevent future erosion.

2.11.19. All temporary dams built on the right-of-way shall be removed after line construction unless otherwise approved by the STATE INSPECTOR. Dams allowed to remain shall be upgraded to permanent structures and shall be provided with spillways or culverts, a continuous sod cover on their tops, and downstream slopes meeting dam safety standards. Spillways may be protected against erosion with riprap or equivalent means.

2.11.20. Damage resulting from erosion or other causes shall be repaired after completion of grading and before revegetation is begun.

2.11.21. Point discharge of water will be dispersed in a manner to avoid erosion or sedimentation of streams as required in DEQ permits.

2.11.22. Riprap or other erosion control activities will be planned based on possible downstream consequences of activity, and installed during the low flow season if possible.

2.11.23. Water used in embankment material processing, aggregate processing, concrete curing, foundation and concrete lift cleanup, and other wastewater processes shall not be discharged into surface waters without a valid discharge permit from DEQ.

2.12. ARCHAEOLOGICAL, HISTORICAL AND PALEONTOLOGICAL RESOURCES

2.12.1. All construction activities shall be conducted so as to prevent damage to significant archaeological, historical, or paleontological resources, in accordance with the requirements of 1.4.1 and Appendix I.

2.12.2. Any relics, artifacts, fossils or other items of historical, paleontological, or archaeological value shall be preserved in a manner acceptable to both the LANDOWNER and the State Historic Preservation Officer. If any such items are discovered during construction, SHPO shall be notified immediately. Work that could disturb the materials or surrounding area must cease until the site can be properly evaluated by a qualified archaeologist (either employed by the OWNER, managing agency or representing SHPO) and recommendations made by that person based on the Historic Preservation Plan outlined in Appendix I (but in no case more than 10 days). For significant sites, the OWNER must follow recommendations of SHPO.

2.12.3. The OWNER shall conform to treatments recommended for cultural resources by either SHPO or the Advisory Council on Historic Preservation (ACHP).

2.13. PREVENTION AND CONTROL OF FIRES

2.13.1. Burning, fire prevention, and fire control shall comply with the burning plan and fire plan in Appendix J. These plans shall meet the requirements of the managing agency and/or the fire control agencies having jurisdiction. The STATE INSPECTOR shall be invited to attend all meetings with these agencies to discuss or prepare these plans. The STATE INSPECTOR, in turn, shall notify DNRC of all such meetings.

2.13.2. The OWNER shall direct the CONTRACTOR to comply with regulations of any county, town, state or governing municipality having jurisdiction regarding fire laws and regulations.

2.13.3. Blasting caps, powder, and other explosives shall be stored only in approved areas and containers and always separate from each other.

2.13.4. The OWNER shall direct the CONTRACTOR to properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The OWNER shall direct the CONTRACTOR not to burn refuse such as trash, rags, tires, plastics, or other debris, except as permitted by the county, town, state, or governing municipality having jurisdiction.

2.14. WASTE DISPOSAL

2.14.1. The OWNER shall direct the CONTRACTOR to use licensed solid waste disposal sites. Inert materials (Group III wastes) may be disposed of at licensed Class III landfill sites; mixed refuse (Group II wastes) must be disposed of at licensed Class II landfill sites.

2.14.2. Emptied pesticide containers or other chemical containers must be triple rinsed to render them acceptable for disposal in Class II landfills or for scrap recycling pursuant to ARM 17.54.201 for treatment or disposal. Pesticide residue and pesticide containers shall be disposed of in accordance with ARM 17.30.637.

2.14.3. All waste materials constituting a hazardous waste defined in ARM 16.44.303, and wastes containing any concentration of polychlorinated biphenyls must be transported to an approved designated hazardous waste management facility (as defined in ARM 17.53.201) for treatment or disposal.

2.14.4. All used oil shall be hauled away and recycled or disposed of in a licensed Class II landfill authorized to accept liquid wastes or in accordance with 2.14.2 and 2.14.3 above. There shall be no intentional release of crankcase oil or other toxic substances into streams or soil. In the event of an accidental spill into a waterway, the substances will be cleaned up and the STATE INSPECTOR will be contacted immediately. Any spill of refined petroleum products greater than 25 gallons must be reported to the State at Disaster and Emergency Services at 406-841-03911.

2.14.5. Sewage shall not be discharged into streams or streambeds. The OWNER shall direct the CONTRACTOR to provide refuse containers and sanitary chemical toilets, convenient to all principal points of operation. These facilities shall comply with applicable federal, state, and local health laws and regulations. A septic tank pump licensed by the State shall service these facilities.

2.14.6. In order to reduce fire hazard, small trees and brush cut during construction should be chipped, burned, and/or scattered. Slash 3 inches in diameter or greater may be scattered in quantities of up to 15 tons/acre unless otherwise requested by the LANDOWNER. Tops, limbs and brush less than 3 inches in diameter and 3 feet in length may be left in quantities less than 3 tons per acre except on cropland and residential land or where otherwise specified by the LANDOWNER. In certain cases the STATE INSPECTOR will authorize chipping and scattering of tops, limbs and brush in excess of 3 tons per acre as an erosion control measure. Merchantable timber should be decked and removed at the direction of the LANDOWNER or managing agency

2.14.7. Refuse burning shall require the prior approval of the LANDOWNER and a Montana Open Burning Permit must be obtained from DEQ. Any burning of wastes shall comply with section 2.13 of these specifications.

2.15. SPECIAL MEASURES

2.15.1. Poles with a low reflectivity constant should be used to reduce potential for visual contrast.

2.15.2. At river crossings, strategic placement of structures should be done both as a means to screen views of the transmission line and right-of-way and to minimize the need for vegetative clearing. Crossings of rivers should be designed to avoid diagonal crossings.

3.0 POST-CONSTRUCTION CLEANUP AND RECLAMATION

3.1. CLEANUP

3.1.1. All litter resulting from construction is to be removed from the right-of-way and along access roads leading to the right-of-way. Such litter shall be legally disposed of as soon as possible, but in no case later than 60 days following completion of wire clipping. If requested by the LANDOWNER, the OWNER shall provide for removal of any additional construction-related debris discovered after this initial cleanup.

3.1.2. Insofar as practical, all signs of temporary construction facilities such as haul roads, work areas, buildings, foundations or temporary structures, soil stockpiles, excess or waste materials, or any other vestiges of construction shall be removed and the areas restored to as natural a condition as practical, in consultation with the LANDOWNER.

3.2. RESTORATION, RECLAMATION, AND REVEGETATION

3.2.1 Restoration, reclamation, and revegetation of the right-of-way, access roads, crane pads, splicing or stringing sites, borrow sites, gravel fill, stone, or aggregate excavation, or any other disturbance shall be in accordance with the reclamation and revegetation plan (Appendix K). The OWNER may choose to develop this plan in consultation with appropriate land management agencies as part of easement negotiations. In this case, the OWNER shall provide written documentation of consultation with those agencies and a copy of the agreed-to plan.

This plan and any conditions to the Certificate approved by DEQ shall be attached as Appendix K.

3.2.2. Scarring or damage to any landscape feature listed in Appendix A shall be restored as nearly as practical to its original condition. Bare areas created by construction activities will be reseeded in compliance with Appendices K and L to prevent soil erosion.

3.2.3. After construction is complete, and in cooperation with the LANDOWNER, temporary roads shall be closed.

3.2.4. In agricultural areas where soil has been compacted by movement of construction equipment and unless otherwise specified by the LANDOWNER, the OWNER shall direct the CONTRACTOR to rip the soil deep enough to restore productivity, or if complete restoration is not possible, the OWNER shall compensate the LANDOWNER for lost productivity.

3.2.5. Earth next to access roads that cross streams shall be replaced at slopes less than the normal angle of repose for the soil type involved.

3.2.6. All drainage channels shall be restored to a gradient and width that will prevent accelerated gully erosion.

3.2.6. Drive-through dips, open-top box culverts, waterbars, or cross drains shall be added to roads at the proper spacing and angle as necessary to prevent erosion.

3.2.7. Interrupted drainage systems shall be restored.

3.2.8. Sidecasting of waste materials may be allowed on slopes over 40 percent after approval by the LANDOWNER, however, this will not be allowed within the buffer strip established for stream courses, in areas of high or extreme soil instability, or in other SENSITIVE AREAS identified in Appendix A. Surplus materials shall be hauled to LANDOWNER-approved sites in such areas.

3.2.9. Seeding prescriptions to be used in revegetation, requirements for hydroseeding, fertilizing, and mulching, as jointly determined by representatives of the OWNER, DEQ, and other involved state and federal agencies, are specified in Appendix L.

3.2.10. Piling and windrowing of material for burning shall use methods that will prevent significant amounts of soil from being included in the material to be burned and minimize destruction of ground cover. Non-mechanized methods are recommended if necessary to minimize soil erosion and vegetation disturbance. Piles shall be located so as to minimize danger to timber and damage to ground cover when burned.

3.2.11. During restoration in areas where topsoil has been stockpiled, the site will be graded to near natural contours and the topsoil will be replaced on the surface.

3.2.12. Excavated material not suitable or required for backfill shall be evenly filled back onto the cleared area prior to spreading any stockpiled soil. Large rocks and boulders uncovered during excavation and not buried in the backfill will be disposed of as approved by the STATE INSPECTOR and/or LANDOWNER.

3.2.13. Application rates and timing of seeds and fertilizer, and purity and germination rates of seed mixtures, shall be as determined in consultation with DEQ. Reseeding shall be done at the first appropriate opportunity after construction ends.

3.2.14. Where appropriate, hydro seeding, drilling, or other appropriate methods shall be used to aid revegetation. Mulching with straw, wood chips, or other means shall be used where necessary. Areas requiring such treatment are listed in Appendix L.

3.2.15. All temporary roads shall be obliterated and reclaimed (with the concurrence of the LANDOWNER), as specified in Appendix M. All temporary roadways shall be graded and scarified as specified to permit the growth of vegetation and to discourage traffic. Permanent unsurfaced roadbeds not open to public use will be revegetated as soon after use as possible unless specified otherwise by the LANDOWNER.

3.3. MONITORING

3.3.1. Upon notice by the OWNER, the STATE INSPECTOR will schedule initial post-construction field inspections following cleanup and road closure. Follow-up visits will be scheduled as required to monitor the effectiveness of erosion controls, reseeding measures, and the right-of-way management plan (Appendix N). The STATE INSPECTOR will contact the LANDOWNER for post-construction access and to determine LANDOWNER satisfaction with the OWNER's restoration measures.

3.3.2. The STATE INSPECTOR shall document observations for inclusion in monitoring reports regarding bond release or the success of mitigating measures required by DEQ.

3.3.2. Failure of the OWNER to adequately reclaim all disturbed areas in accordance with section 3.2 and ARM 17.20.1902(10) shall be cause for forfeiture of the reclamation BOND(s) or penalties described in Section 0.3. Success of revegetation shall be based on criteria specified in ARM 17.20.1902(10). Failure of the OWNER to achieve adequate revegetation of disturbed areas may be cause for forfeiture of the revegetation BOND(s) or penalties described in Section 0.3.

4.0. OPERATION AND MAINTENANCE

4.1. RIGHT-OF-WAY MANAGEMENT AND ROAD MAINTENANCE

4.1.1. Maintenance of the right-of-way and permanent access roads shall be as specified in the right-of-way management plan (Appendix N). This plan shall provide for the protection of SENSITIVE AREAS identified prior to and during construction as well as control of erosion on permanent access roads.

4.1.2. Vegetation that has been saved through the construction process and which does not pose a hazard or potential hazard to the transmission line, particularly that of value to fish and wildlife as specified in Appendix A, shall be allowed to grow on the right-of-way.

4.1.3. Vegetative cover adjacent to the transmission line in areas other than cropland shall be maintained in cooperation with the LANDOWNER.

4.1.4. Grass cover, water bars, cross drains, the proper slope, and other agreed to measures shall be maintained on permanent access roads and service roads in order to prevent soil erosion.

4.2. MAINTENANCE INSPECTIONS

4.2.1. The OWNER shall have responsibility to correct soil erosion, noxious weed, or revegetation problems on the right-of-way or access roads as they become known. Appropriate corrective action will be taken where necessary. The OWNER, through agreement with the LANDOWNER or managing agency, may provide a mechanism to identify and correct such problems but the OWNER is responsible for correcting these problems.

4.2.2. Operation and maintenance inspections using ground vehicles shall be timed so that routine maintenance will be done when access roads are firm, dry, or frozen, wherever possible. Maintenance vegetative clearing shall be done according to criteria spelled out in Appendix N.

4.3. CORRECTION OF LANDOWNER PROBLEMS

4.3.1. When the facility causes interference with radio, TV, or other stationary communication systems after the facility is operating, the OWNER will correct the interference with mechanical corrections to facility hardware, or antennas, or will install remote antennas or repeater stations, or will use other reasonable means to correct the problem.

4.3.2. The OWNER will respond to complaints of interference by investigating complaints to determine the origin of the interference. If the interference is not caused by the facility, the OWNER shall so inform the person bringing the complaint. The OWNER shall provide the STATE INSPECTOR with documentation of the evidence regarding the source of the interference if the person brings the complaint to the STATE INSPECTOR or DEQ.

4.4. HERBICIDES AND WEED CONTROL

4.4.1. Weed control, including any application of herbicides in the right-of-way, will be done by applicators currently licensed in Montana and in accordance with recommendations of the Montana Department of Agriculture, and in accordance with the right-of-way maintenance plan in Appendix N.

4.4.2. Herbicides will not be used in certain areas identified by DEQ and FWP, as listed in Appendix O or as requested by the LANDOWNER.

4.4.3. Proper herbicide application methods will be used to keep drift and nontarget damage to a minimum.

4.4.4. Herbicides must be applied according to label specifications and in accordance with 4.4.1 above. Only herbicides registered in compliance with applicable federal and state laws may be applied.

4.4.5. Herbicides shall not be sprayed during heavy rains or threat of heavy rains. Vegetation buffer zones shall be left along all identifiable stream channels. Herbicides shall not be used in any public water supply watershed identified by DEQ.

4.4.6. In areas disturbed by the transmission line, the OWNER will cooperate with LANDOWNERs in control of noxious weeds as designated by the weed control board having jurisdiction in the county crossed by the line.

4.4.6. The OWNER shall notify the STATE INSPECTOR in writing 30 days prior to any broadcast or aerial spraying of herbicides. The notice shall provide details as to the time, place, and justification for such spraying. DEQ, FWP, and the Montana Department of Agriculture shall have the opportunity to inspect the portion of the right-of-way or access roads before, during, and after spraying.

4.4.7. During the second and third growing seasons following the completion of restoration and reseeding, the OWNER and STATE INSPECTOR shall inspect the right-of-way and access roads for newly established stands of noxious weeds. The county weed control supervisor shall be invited to attend this inspection. In the event that stands of weeds are encountered, the OWNER shall take appropriate control measures.

4.5. MONITORING

4.5.1. DEQ may continue to monitor operation and maintenance activities for the life of the project in order to ensure compliance with the specifications in this section (see Appendix Q).

4.5.2. The OWNER will be responsible to DEQ for the term of the reclamation BOND (Section 0.8). Following BOND release, the OWNER will report to individual LANDOWNERs and managing agencies except as specified in conditions to the certificate.

4.5.3. Upon reasonable complaint from an affected LANDOWNER or managing agency, DEQ may require the OWNER to fund additional monitoring efforts to resolve problems that develop after release of the BONDs. Such efforts would be limited to determining compliance with these specifications and other conditions of the Certificate.

5.0 ABANDONMENT

When the transmission line is no longer used or useful, structures, conductors, and ground wires shall be removed and disturbed areas reclaimed using methods outlined in Appendix K.

APPENDICES

APPENDIX A: SENSITIVE AREAS FOR THE MATL TRANSMISSION LINE PROJECT

The following sensitive areas have been identified where special measures would be implemented to reduce impacts:

Land Use/Infrastructure

To minimize impacts to farming, DEQ could require the use of monopoles in the following sensitive areas to reduce impacts associated with diagonal crossing of farmland where routing around this farmland would be difficult. In addition single poles would be used on Alternative 2 where the proposed line would cross irrigated land and where the proposed transmission line would parallel an existing powerlines:

	Alternative 2	Alternative 3	Alternative 4
Milepost to Milepost	0 – 1.05 1.25-1.856.12-6.45 6.8-14 48.5-52.355.0-55.9–56.34-56.53 58.7-64.3 71.1-72.5(Belgian Hill Road reroute) 90-91.95 92.2-92.82 An additional 1.5 miles of monopole structures would be distributed among LANDOWNERs whose cropland is crossed on a diagonal based on easement negotiations.	0 – 87 (essentially all cropland and CRP)	32 – 36 44 - 45 62 - 66 82 - 83 107 - 109 112 – 114
Total Miles	23.56	<87	14

Geological/Soils

Black Horse Lake

Alternatives 2 and 3 at milepost 4.35 to 4.52 The alignment would be widened an additional 500 feet further south to allow flexibility in pole placement that would avoid an area occasionally flooded by Black Horse Lake.

Teton River Crossing Area

Precision mapping for unstable soils would be conducted along the alignment between the milepost markers identified below:

Alternative 2 between mileposts 35.3 and 35.8, 36.2 and 36.6, 36.9 and 37.4, and between mileposts38 and 40

Alternative 3 between mileposts 32.3 and 32.7, 33.08 and 33.47, and between mileposts 33.8 and 34.0 (where a landslide is crossed)

Alternative 4 between mileposts 36.18 and 36.7, 37.27 and 37.55, 37.9 and 38.4, and between mileposts 39.08 and 41.15

On Alternative 2 the alignment would be narrowed south of the river to avoid a landslide and north of the river would widened by an additional 250 feet north of the centerline between mileposts 38 and 40 to avoid areas of slope instability in this area. A similar measure would be applied should Alternative 4 be selected. .

Dry Fork of Marias River Crossing

Alternative 4 between mileposts 69.8 and 70.2, 70.5 and 70.8, 71.1 and 71.4, 71.65 and 72.8, 73.7 and 73.75, 75.1 and 75.7, 76.1 and 76.4, 77.05 and 77.4, 77.7 and 78.05, 80.15and 81.15, 81.35 and 81.9

The alignment would be widened to 1000 feet except on cultivated land to allow flexibility in pole placement should new cultural resource sites be encountered. Precision mapping for unstable soils should be conducted along the alignment between the milepost markers identified above. Structures and roads would be located to avoid unstable slopes. If cultural resource sites are encountered and the alignment moved, additional mapping of unstable soils would be required.

Marias River Crossing Area

Alternative 2 between mileposts 88.75 and 88.82, 89.1 and 89.4, 89.8 and 90.0, 90.35 and 90.72

Alternative 3 between mileposts 84.3 and 84.65, 84.78 and 84.95, 85.4 and 85.8

Alternative 4 between mileposts 95.2 and 97.1

Precision mapping for unstable soils must be conducted along the alignment between the milepost markers identified above.

Wildlife

On the selected alternative, areas of native vegetation that have not been surveyed for grouse leks would be surveyed prior to construction. Construction would not occur during the mating season from __ to __ within __ miles of leks. Anti perching devices would be installed and maintained on structures within __ miles of leks.

Overhead ground wires would be marked in the following areas within 2 miles of leks to reduce the potential for avian collisions with the transmission line.

Alternative 2 between mileposts 85.7 and 92

Alternative 3 between mileposts 81 and 87

Alternative 4 between mileposts 9.5 and 10.5 and 95.5 and 101.5

Overhead ground wires near wetlands would be marked to reduce the potential for collisions after inspection and field verification of the need for marking by FWP and FWS biologists.

Cultural Resources

Cultural resource surveys would be completed along unsurveyed areas with a high probability of discovering new sites. If cultural resource sites are discovered, structure locations and access routes would be modified to avoid sensitive features or the site recorded.

A professional archeologist would observe construction in high probability areas listed below during pole placement. If cultural resources are discovered during excavation, construction would be temporarily halted while theOWNER completes recovery of artifacts. Artifacts are the property of theLANDOWNER.

Alternative 2 between mileposts 0 and 15, 31 and 40, 52 and 60, 65 and 70, 72 and 83, 88 and 91, 98 and 101, 107 and 109, and 112 and 125

Alternative 3 between mileposts 0 and 15, 29 and 37, and 49 and 56, 61 and 66, 75 and 77, 83 and 86, 93 and 96, and 107 and 102

Alternative 4 between mileposts 0 and 15, 34 and 41, 55 and 57, 59 and 65, 70 and 91, 98 and 101, 108 and 111, 117 and 119, and 122 and 135

Wetlands

MATL would delineate wetlands within 500 feet of the alignment of the approved alternative for the portion through Teton County where wetlands have not been mapped by the USFWS.

Alternative 2 between mileposts 23 and 35

Alternative 3 between mileposts 17 and 42

Alternative 4 between mileposts 23 and 48

Vegetation

MATL would avoid placing roads and poles in designated 100 year floodplains.

Additional areas for monitoring or for application of mitigation measures may be identified following the pre-construction monitoring trip by the State Inspector or the Inspector's designee.

APPENDIX B: PERFORMANCE BOND SPECIFICATIONS

Construction and reclamation bonds shall be used to ensure performance with these specifications.

APPENDIX C: VARIATIONS IN RIGHT-OF-WAY WIDTH

See Appendix A for variations in right-of way widths.

DEQ does not recommend specific widths for construction easements. In accordance with the specifications, construction activities shall be contained in the minimum area necessary for safe and prudent construction.

DEQ does not recommend specific variations in right-of-way widths beyond those required to meet the National Electric Safety Code for electric transmission line operations and those necessary to meet standards established in ARM 17.20.1607(2).

APPENDIX D: AREAS WHERE CONSTRUCTION TIMING RESTRICTIONS APPLY

Except for those areas described in Appendix A, no restrictions in the timing of construction are recommended, beyond those considered necessary on the basis of on-site inspections of stream crossings required in Section 2.11.6 of these specifications and in other sections of these specifications, or as negotiated by LANDOWNERs in individual easement agreements.

APPENDIX E: AERONAUTICAL HAZARD MARKINGS

For all alternatives, the OWNER would install FAA-recommended colored aerial markers for aviation safety, as well as at crossings of the Conoco pipeline and crossings of the Cenex pipeline.

For all alternatives, the OWNER would install FAA-recommended aerial markers to make the line more visible to low flying aircraft at crossings of Interstate 15 and U.S. Highways 87 and 2. Marker balls would also be placed at all river crossings.

APPENDIX F: NOXIOUS WEED AREAS

Presence of noxious weed areas will be determined during a joint inspection by the OWNER, affected weed control boards, and LANDOWNERs. Weeds will be controlled as directed by county Noxious Weed Control programs, state law, and these Environmental Specifications.

APPENDIX G: GROUNDING SPECIFICATIONS

Powerlines, fences, and pipelines shall be grounded in accordance with the National Electrical Safety Code. The OWNER shall ensure that operation of the transmission line does not interfere with operation of cathodic protection systems of any pipelines crossed or paralleled.

APPENDIX H: CULVERT AND BRIDGE REQUIREMENTS

It does not appear that new culverts or bridges will be needed during construction. In the event a culvert or bridge is needed, it shall be installed to the standards set forth in Section 2.11.11 of the specifications and following review of the proposed installation by the STATE INSPECTOR. The STATE INSPECTOR may require site specific measures to reduce impacts.

APPENDIX I: HISTORIC PRESERVATION PLAN

The OWNER, in consultation with SHPO, shall develop a plan for identification and treatment of historical or archaeological sites affected by construction. Copies of these plans shall be part of this Appendix. The plan shall identify proposed treatments to be employed to avoid, mitigate or offset project effects on cultural resource sites or culturally significant tribal resources as agreed to by SHPO.

APPENDIX J: BURNING PLAN AND FIRE PLAN

The need for a detailed burning or fire plan is not anticipated for this project. In the event that burning is required prior to or during construction, such burning shall occur in accordance with sections 0.5, 2.13, and 2.14 of the specifications.

APPENDIX K: RECLAMATION AND REVEGETATION PLAN

At least 30 days prior to the start of construction, a reclamation and revegetation plan must be developed and submitted to DEQ for approval. This plan must, at a minimum, specify seeding mixtures, rates, seeding methods and timing of seeding. It must address LANDOWNER wishes, and satisfy requirements of the MPDES General Permit for Storm Water Discharges Associated with Construction Activity and ARM 17.20.1902(10).

If a LANDOWNER's management practices prevent the attainment of 90 percent perennial ground cover after five (5) years, revegetation on that land will be deemed adequate when portions of the right-of-way disturbed by construction and temporary roads are reclaimed to a state of usefulness similar to that existing prior to construction as determined by the STATE INSPECTOR.

APPENDIX L: AREAS WHERE STOCKPILING OF TOPSOIL, HYDRO SEEDING, FERTILIZING, OR MULCHING IS REQUIRED

At each area where cut and fill would be necessary to construct a road or crane pad, the OWNER shall salvage and stockpile topsoil, and spread the topsoil over disturbed areas following construction to increase re-vegetation success.

APPENDIX M: ROADS TO BE CLOSED AND/OR OBLITERATED

If permanent roads are necessary for construction or maintenance of the project, the OWNER shall close or obliterate the roads during decommissioning as requested by the LANDOWNER.

APPENDIX N: RIGHT-OF-WAY MANAGEMENT PLAN

DEQ does not recommend a specific right-of-way management plan. To the extent possible, all maintenance and operation activities shall be performed to comply with the requirements of the environmental specifications.

APPENDIX O: WATERSHEDS AND OTHER AREAS WHERE HERBICIDES ARE PROHIBITED

DEQ does not recommend any areas or watersheds where herbicide use is prohibited. Herbicide use shall conform to all applicable local, state, and federal restrictions.

APPENDIX P: NAME AND ADDRESS OF STATE INSPECTOR

STATE INSPECTOR OWNER'S LIAISON

Environmental Science Specialist
Montana Dept of Environmental Quality
P.O. Box 200901
1520 East Sixth Avenue
Helena, Montana 59620-0901
(406) 444-_____

APPENDIX Q: MONITORING PLAN

The STATE INSPECTOR is responsible for implementing this monitoring plan required by 75-20-303(b) and (c), MCA, and for reporting whether terms of the Certificate of Compliance and Environmental Specifications are being met, along with any conditions in the Stormwater Discharge permit and state land easements. The STATE INSPECTOR may identify additional mitigating measures in order to minimize environmental damage due to unique circumstances that arise during construction. These measures will be presented in writing to the OWNER's Liaison who will see that such measures are implemented in a timely manner.

Within 60 days of the completion of construction the STATE INSPECTOR shall review the project area for adequate cleanup, resoration of compacted soils, and any necessary regarding. The STATE INSPECTOR shall notify the OWNER of additional cleanup and restoration of disturbed areas. Once the area is restored, the restoration bond shall be released as indicated in ARM 17.20.1902(10)-(12).

In the growing season following construction the STATE INSPECTOR will determine the adequacy of erosion controls, check for successful seed germination, and determine in conjunction with county weed supervisors areas where weed control would be necessary.

After one and five complete growing seasons following construction, the STATE INSPECTOR will determine whether revegetation efforts have been sufficient to meet the requirements of Appendix K of these Environmental Specifications. If revegetation is not adequate to meet the requirements of Appendix K, the STATE INSPECTOR shall determine whether it is in the best interest of the State to seize the BOND or BONDs and reclaim and revegetate remaining disturbed areas or to continue to monitor these areas. The STATE INSPECTOR shall respond to complaints from citizens for the life of the project.

When violations of the Certificate are identified, the STATE INSPECTOR shall report the violation in writing to the OWNER, who shall immediately take corrective action. If violations continue, penalties described in 75-20-408, MCA may be imposed.

APPENDIX G:
ALTERNATIVES CONSIDERED BUT DISMISSED BY MATL

APPENDIX G-1
SUMMARY OF MATL'S DISMISSED ALTERNATIVES AND ALIGNMENT SEGMENTS

Name of Alternatives or Segment	**Location**	**Reasons for Not Carrying Forward**
Old Primary – Segment (1)	Original Primary Alignment from Canadian Border to Cut Bank	This alignment was dropped because of its close proximity to two residences, many diagonal farmland crossings, and proximity to wells. This alignment was also dropped because of changes to the preferred Canadian border crossing, and because of limited right-of-way space due to a prairie pothole along Santa Rita Road.
Old Primary – Segment (2)	A subsequent segment revision of the Primary alignment with its border crossing farther west, connecting back to A1 approximately 8 miles to the south.	This segment was further modified (to what is shown as A3 on the map) and ultimately dropped. This change was based on a final revision to the preferred Canadian border crossing location to what is now shown on the proposed route. A2 was also dropped due to diagonal crossings of farmland/cropland and proximity to wells.
Old Primary – Segment (3)	A subsequent Primary Route segment revision altering A2, moving the Canadian border crossing slightly farther west. A3 connects back to A2 approximately 4 miles to the south of the Canadian border.	This segment of the Old Primary Route was further modified to what is now the proposed route as part of initial engineering/surveying in Spring '06 because it crossed wetland areas. This effort allowed for re-routing that better avoided wetlands and prairie potholes.
Old Primary – Segment (4)	Original Primary Route Segment – Camp Nine Road south to old Marias River Crossing	This segment was dropped because it did not make use of the available public lands near the Marias River crossing as is required under MFSA. Routing was modified to that of the proposed route to take advantage of these public lands (BLM).
Old Primary – Segment (5)	Original Primary Route Segment from south of the Marias River Crossing to Bullhead Road	This segment was dropped because it did not utilize available nearby rangeland and had a greater impact on croplands in this location. The proposed route better utilizes rangeland and has less impact on croplands.
Old Primary – Segment (6)	Original Primary Route Segment from Bullhead Creek to Burlington Northern Railroad	This segment was dropped due to many diagonal crossings of farmland/cropland. Routing was modified to that of the proposed route to minimize these impacts to agricultural lands and utilize available rangeland to a much greater extent.
Old Primary – Segment (7)	A subsequent Primary Route Segment 3-4 miles southwest of Conrad near Pondera Coulee.	This segment alternative was dropped due to the proximity of an occupied residence. This segment came within .2 miles to the east of a residence.
Old Primary – Segment (8)	Original Primary Route Segment 2-3 miles southwest of Conrad near Pondera Coulee.	This segment alternative was also dropped due to the proximity of an occupied residence. This segment came within .4 miles of a residence to the west.
Old Primary – Segment (9)	Original Primary Route Segment from two miles north of Brady to approximately three miles north of the Teton River	This segment was dropped to that of the proposed route in this location primarily to avoid impacts to six residences, and to lessen impacts to cropland. In particular this segment came within 0.5 mile of four residences north of Brady as well as within .5 mile of a school.

APPENDIX G-1
SUMMARY OF MATL'S DISMISSED ALTERNATIVES AND ALIGNMENT SEGMENTS

Name of Alternatives or Segment	Location	Reasons for Not Carrying Forward
Old Primary – Segment (9-south)	Original Primary Route Segment around the Teton River Crossing	This segment was dropped because it did not take advantage of nearby public lands (DNRC lands to the west) for the Teton River Crossing and because of probable cultural resources (tipi ring sites) on the northern bluffs of the Teton River in this specific location. The Teton River crossing was moved to the west in order to make use of available public lands and avoid potential cultural impacts, as well as to avoid mature riparian cottonwood forest.
Old Primary – Segment (10)	A subsequent Primary Route Segment that heads west from a point along the Current Primary Route south of Dutton, and continues 4-5 miles to the east where it connects with the Old Primary Route and continues two miles south.	This segment was dropped due to environmental and engineering constraints (slope stability issues) in constructing the line across Timber Coulee in this locale. In addition, this segment alternative did not resolve the goal of minimizing diagonal crossings of farmland to the extent of the current proposed route.
Old Primary – Segment (11)	Another subsequent Primary Route Segment starting several miles south of A10, that heads west ~7 miles to where it connects with the Old Primary Route	This segment was dropped because it crosses close to an existing range/farm near its eastern terminus. In addition, this segment alternative did not resolve the goal of minimizing diagonal crossings of farmland to the extent of the Current Primary Route.
Old Primary – Segment (12)	Original Alternative that followed east of the Great Falls Shooting Sports Complex	This segment conflicts with plans for expansion of the shooting sports complex, including plans for new and expanded buildings. Given this conflict, this segment was dropped in favor of the proposed route which is located west of the complex.
Old Alternative B Segment (1)	Original Alternative B from Canadian Border to where it connects with the Old Primary Route	Original Alternative B was modified and moved to the east to what is labeled as B2 to further avoid impacts to wetlands. In addition the original Alternative B also crossed within .25 mile of an occupied residence.
Old Alternative B Segment (2)	A subsequent Alternative B segment from Canadian Border to (new) Primary Route	This segment was dropped to avoid impacts to nearby residences and because there is no longer a Canadian Alternative or border crossing in this specific location. Alternative B now starts near Cut Bank and continues south to the Great Falls terminus.
Old Alternative B Segment (3)	Original Alternative B near Bullhead Creek	Various small sections of this segment were modified to what is now the proposed alignment to better avoid residences and irrigated croplands, avoid wetlands, as well as to improve the alignment of the route with property boundaries.
Old Alternative B Segment (4)	Original Alternative B from Dry Fork of the Marias south to South Pondera Coulee	Various small sections of this segment were modified to what is now the proposed alignment to better avoid residences and irrigated croplands, as well as to improve the alignment of the route with property boundaries.
Original Route C	From Canadian Border to Great Falls	Original Route which was modified to what is labeled as "Modified Route C" (C2) below to better avoid residences and passage across irrigated croplands, as well as to improve the alignment of the route with property boundaries.

APPENDIX G-1
SUMMARY OF MATL'S DISMISSED ALTERNATIVES AND ALIGNMENT SEGMENTS

Name of Alternatives or Segment	Location	Reasons for Not Carrying Forward
Modified Route C	From Canadian Border to Great Falls	The entire C2 routing was dismissed because it was the longest of the considered routes and would be the most costly to design/construct. More estimated acreage would be required (access roads, staging areas, etc.) than the Primary Route (43 acres versus 37 acres). Alternative C also had relatively higher potential impacts to visual resources (comes within 1 mile of 160 developed residences as compared to 146 for the Preferred Route). C2 also had a larger impact to prime farmland (44 miles versus 33 miles) and farmland of statewide importance (47 miles versus 43 miles) as compared to the Primary Route. In addition, this route did not match up with the finalized secondary Canadian border crossing alternative (moved to the east).
August Version Route C	From Canadian Border to Great Falls	This route was prepared for the MFSA application. This route was dismissed because it is the longest alternative, would require more disturbance, and very close to or crosses four houses.
Old Western Great Falls Alternative	Original agency alternative that connects with Great Falls to the south and west of the Primary Alternative	This alternative was originally identified in order to provide another alternative in the in the southern quarter of the project area that made wide use of rangeland instead of cropped land. However, this alternative was dropped/modified to what is labeled as W2 in order to avoid crossing the existing WAPA line and improve its alignment with property and section line boundaries.
Modified Western Great Falls Alternative	Modified agency alternative that connects with Great Falls to the south and west of the Primary Alternative	After flyover verification, this revised W2 alternative was developed to minimize deflections and parallel the WAPA line more closely. This alternative has been retained because of its use of range land and pasture as well as its more extensive use of section and property boundaries.
Cut Bank to Shelby Alternative	Alternative that follows from Cut Bank to Shelby	This alternative was dismissed in the original application due to the need for extended diagonal traversing of agricultural lands. This alternative also had more engineering requirements and land requirements, and would have resulted in higher project costs.
Shelby South Alternative	Alternative that follows from Shelby south to Great Falls	This alternative was dismissed in the original application due to engineering constraints and the potential for disturbing many more cultural and archaeological sites near the Maris River breaks area south of Shelby.
Eastern Alternative	Alternative that follows Interstate 15 from Border to Shelby	This alternative was dismissed in the original application due to difficulties with the connection required via the Shelby South alternative described above.
NWE Alternative	Rebuilds the existing NWE 115-kV line.	This alternative was dismissed in the original application. This route was considered infeasible for economic reasons, and there would also have been a logistical difficulty in maintaining service while upgrading the existing line.

APPENDIX H:
LAND USE TYPES BY MILEPOST

The following tables provide a breakdown of land uses along the alignments analyzed in the EIS. Riparian, forest and right of way land uses are included in the summary tables in the EIS as "Other." Mile posts run from south to north. The analysis was done with GIS, based on photographic interpretation of the land uses.

Appendix H-1
Land Use Categories Crossed By Alternative 2

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
0.00	1.50	1.50	Non-Irrigated
1.50	1.52	0.03	Rangeland/Native
1.52	1.58	0.05	Riparian
1.58	1.65	0.08	Rangeland/Native
1.65	1.71	0.06	Riparian
1.71	1.73	0.02	Rangeland/Native
1.73	1.97	0.24	Non-Irrigated
1.97	2.01	0.04	Riparian
2.01	2.03	0.02	Non-Irrigated
2.03	2.05	0.02	Riparian
2.05	5.29	3.24	Non-Irrigated
5.29	8.20	2.92	Rangeland/Native
8.20	9.11	0.91	Non-Irrigated
9.11	9.15	0.03	Riparian
9.15	11.18	2.03	Non-Irrigated
11.18	11.52	0.34	Rangeland/Native
11.52	11.95	0.43	Non-Irrigated
11.95	12.08	0.12	Rangeland/Native
12.08	12.21	0.14	Riparian
12.21	12.53	0.32	Non-Irrigated
12.53	12.55	0.02	Riparian
12.55	14.94	2.39	Non-Irrigated
14.94	15.21	0.26	Rangeland/Native
15.21	15.77	0.56	Non-Irrigated
15.77	15.82	0.05	Rangeland/Native
15.82	16.95	1.13	Non-Irrigated
16.95	18.14	1.20	Rangeland/Native
18.14	19.41	1.26	Non-Irrigated
19.41	19.43	0.03	Riparian
19.43	26.77	7.34	Non-Irrigated

Appendix H-1
Land Use Categories Crossed By Alternative 2

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
26.77	26.88	0.11	Riparian
26.88	27.15	0.27	Non-Irrigated
27.15	27.30	0.15	Riparian
27.30	29.84	2.54	Non-Irrigated
29.84	29.92	0.08	Right of way
29.92	30.96	1.04	Non-Irrigated
30.96	36.98	6.03	Rangeland/Native
36.98	37.60	0.62	Non-Irrigated
37.60	37.84	0.23	Rangeland/Native
37.84	39.06	1.22	Non-Irrigated
39.06	39.43	0.37	Rangeland/Native
39.43	39.58	0.15	Non-Irrigated
39.58	39.63	0.05	Rangeland/Native
39.63	39.80	0.17	Non-Irrigated
39.80	39.97	0.17	Rangeland/Native
39.97	40.05	0.08	Riparian
40.05	41.37	1.32	Rangeland/Native
41.37	43.96	2.59	Non-Irrigated
43.96	44.32	0.36	Rangeland/Native
44.32	44.46	0.14	Irrigated
44.46	44.87	0.40	Non-Irrigated
44.87	44.98	0.11	Rangeland/Native
44.98	45.13	0.15	Non-Irrigated
45.13	45.49	0.36	Rangeland/Native
45.49	46.97	1.48	Non-Irrigated
46.97	47.04	0.07	Rangeland/Native
47.04	47.35	0.31	Non-Irrigated
47.35	47.38	0.02	Rangeland/Native
47.38	48.43	1.05	Non-Irrigated
48.43	50.02	1.59	Rangeland/Native
50.02	50.27	0.25	Non-Irrigated
50.27	51.40	1.13	Rangeland/Native
51.40	51.51	0.11	Non-Irrigated
51.51	51.70	0.19	Rangeland/Native

Appendix H-1
Land Use Categories Crossed By Alternative 2

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
51.70	51.77	0.06	Non-Irrigated
51.77	51.79	0.02	Rangeland/Native
51.79	51.83	0.04	Non-Irrigated
51.83	51.90	0.07	Rangeland/Native
51.90	51.96	0.06	Non-Irrigated
51.96	52.03	0.07	Rangeland/Native
52.03	52.10	0.07	Non-Irrigated
52.10	52.48	0.38	Rangeland/Native
52.48	52.57	0.09	Non-Irrigated
52.57	52.72	0.15	Rangeland/Native
52.72	52.75	0.03	Non-Irrigated
52.75	52.90	0.15	Rangeland/Native
52.90	53.10	0.20	Non-Irrigated
53.10	53.18	0.08	Rangeland/Native
53.18	55.54	2.36	Non-Irrigated
55.54	56.06	0.52	Rangeland/Native
56.06	56.10	0.04	Right of way
56.10	56.44	0.34	Non-Irrigated
56.44	56.86	0.42	Irrigated
56.86	56.95	0.09	Rangeland/Native
56.95	56.97	0.02	Riparian
56.97	57.07	0.10	Rangeland/Native
57.07	57.10	0.02	Riparian
57.10	57.17	0.08	Rangeland/Native
57.17	57.21	0.03	Non-Irrigated
57.21	57.25	0.04	Rangeland/Native
57.25	57.75	0.51	Non-Irrigated
57.75	57.78	0.02	Riparian
57.78	59.01	1.24	Non-Irrigated
59.01	59.03	0.01	Water
59.03	59.19	0.17	Non-Irrigated
59.19	59.56	0.37	Irrigated
59.56	59.57	0.01	Water
59.57	59.93	0.36	Irrigated

Appendix H-1
Land Use Categories Crossed By Alternative 2

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
59.93	59.95	0.02	Right of way
59.95	60.17	0.21	Irrigated
60.17	60.20	0.03	Rangeland/Native
60.20	61.19	0.99	Non-Irrigated
61.19	61.26	0.07	Rangeland/Native
61.26	61.61	0.35	Riparian
61.61	62.75	1.14	Non-Irrigated
62.75	63.31	0.56	Rangeland/Native
63.31	64.29	0.98	Non-Irrigated
64.29	65.42	1.13	Rangeland/Native
65.42	67.35	1.93	Non-Irrigated
67.35	67.43	0.08	Riparian
67.43	68.81	1.38	Non-Irrigated
68.81	68.95	0.14	Riparian
68.95	71.18	2.23	Non-Irrigated
71.18	71.32	0.15	Rangeland/Native
71.32	71.57	0.24	Non-Irrigated
71.57	71.83	0.26	Rangeland/Native
71.83	71.89	0.06	Non-Irrigated
71.89	72.05	0.16	Rangeland/Native
72.05	72.18	0.12	Non-Irrigated
72.18	72.37	0.19	Rangeland/Native
72.37	72.73	0.37	Non-Irrigated
72.73	73.18	0.45	Rangeland/Native
73.18	73.37	0.19	Non-Irrigated
73.37	73.43	0.05	Right of way
73.43	73.81	0.39	Rangeland/Native
73.81	75.73	1.92	Non-Irrigated
75.73	75.84	0.11	Riparian
75.84	75.99	0.15	Non-Irrigated
75.99	76.38	0.39	Rangeland/Native
76.38	76.67	0.29	Non-Irrigated
76.67	76.83	0.16	Rangeland/Native
76.83	76.89	0.06	Right of way

Appendix H-1
Land Use Categories Crossed By Alternative 2

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
76.89	76.96	0.07	Rangeland/Native
76.96	77.88	0.91	Non-Irrigated
77.88	77.95	0.07	Rangeland/Native
77.95	78.54	0.59	Non-Irrigated
78.54	78.59	0.05	Riparian
78.59	78.69	0.10	Rangeland/Native
78.69	81.20	2.52	Non-Irrigated
81.20	81.25	0.05	Riparian
81.25	81.56	0.31	Non-Irrigated
81.56	81.65	0.09	Rangeland/Native
81.65	89.92	8.27	Non-Irrigated
89.92	90.16	0.25	Rangeland/Native
90.16	90.63	0.47	Non-Irrigated
90.63	91.06	0.43	Rangeland/Native
91.06	91.35	0.29	Non-Irrigated
91.35	91.70	0.35	Rangeland/Native
91.70	92.23	0.53	Non-Irrigated
92.23	92.31	0.08	Riparian
92.31	92.34	0.03	Rangeland/Native
92.34	92.44	0.10	Non-Irrigated
92.44	92.65	0.21	Rangeland/Native
92.65	93.12	0.46	Non-Irrigated
93.12	93.34	0.23	Rangeland/Native
93.34	93.99	0.65	Non-Irrigated
93.99	94.33	0.34	Rangeland/Native
94.33	95.92	1.58	Non-Irrigated
95.92	96.08	0.17	Riparian
96.08	98.14	2.05	Non-Irrigated
98.14	98.17	0.04	Rangeland/Native
98.17	98.19	0.02	Riparian
98.19	98.22	0.03	Rangeland/Native
98.22	99.10	0.88	Non-Irrigated
99.10	99.16	0.06	Rangeland/Native
99.16	99.59	0.43	Non-Irrigated

Appendix H-1 Land Use Categories Crossed By Alternative 2			
Mile Post Begin	**Mile Post End**	**Distance (Miles)**	**Land Use**
99.59	99.69	0.10	Rangeland/Native
99.69	99.87	0.19	Non-Irrigated
99.87	99.91	0.04	Right of way
99.91	99.96	0.05	Non-Irrigated
99.96	100.01	0.05	Rangeland/Native
100.01	100.92	0.92	Non-Irrigated
100.92	100.95	0.03	Riparian
100.95	102.90	1.95	Non-Irrigated
102.90	104.31	1.42	Rangeland/Native
104.31	105.82	1.51	Non-Irrigated
105.82	106.80	0.97	Rangeland/Native
106.80	107.98	1.19	Non-Irrigated
107.98	111.44	3.46	Rangeland/Native
111.44	111.84	0.40	Non-Irrigated
111.84	112.00	0.16	Rangeland/Native
112.00	122.69	10.69	Non-Irrigated
122.69	123.16	0.47	Rangeland/Native
123.16	123.47	0.31	Non-Irrigated
123.47	125.13	1.67	Rangeland/Native
125.13	125.67	0.54	Non-Irrigated
125.67	125.83	0.16	Rangeland/Native
125.83	126.82	0.99	Non-Irrigated
126.82	127.75	0.93	Right of way
127.75	128.24	0.49	Non-Irrigated
128.24	128.42	0.18	Rangeland/Native
128.42	128.46	0.04	Riparian
128.46	128.73	0.28	Non-Irrigated
128.73	128.77	0.04	Right of way
128.77	129.60	0.83	Non-Irrigated
0.00	129.60	129.60	Miles

Appendix H-2
Land Use Categories Crossed By Alternative 3

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
0.00	0.04	0.04	Non-Irrigated
0.04	0.79	0.75	Rangeland/Native
0.79	3.31	2.52	Non-Irrigated
3.31	3.46	0.15	Rangeland/Native
3.46	4.00	0.54	Non-Irrigated
4.00	5.65	1.67	Rangeland/Native
5.65	5.95	0.30	Non-Irrigated
5.95	6.43	0.48	Rangeland/Native
6.43	18.96	12.52	Non-irrigated
18.96	19.04	0.08	Rangeland/Native
19.04	20.85	1.81	Non-Irrigated
20.85	20.92	0.07	Rangeland/Native
20.92	21.00	0.08	Riparian
21.00	21.71	0.71	Non-Irrigated
21.71	22.09	0.39	Rangeland/Native
22.09	23.60	1.50	Non-Irrigated
23.60	23.82	0.22	Rangeland/Native
23.82	30.75	6.94	Non-Irrigated
30.75	30.79	0.03	Riparian
30.79	32.15	1.37	Non-Irrigated
32.15	32.64	0.48	Rangeland/Native
32.64	33.00	0.37	Non-Irrigated
33.00	33.63	0.63	Rangeland/Native
33.63	33.74	0.10	Riparian
33.74	33.77	0.03	Forest
33.77	34.01	0.23	Rangeland/Native
34.01	47.66	13.66	Non-Irrigated
47.66	47.78	0.12	Rangeland/Native
47.78	47.81	0.02	Riparian
47.81	48.24	0.43	Non-Irrigated
48.24	48.39	0.15	Rangeland/Native
48.39	48.41	0.02	Riparian
48.41	49.16	0.75	Non-Irrigated

Appendix H-2
Land Use Categories Crossed By Alternative 3

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
49.16	49.20	0.03	Rangeland/Native
49.20	49.34	0.14	Non-Irrigated
49.34	49.38	0.04	Rangeland/Native
49.38	49.42	0.04	Riparian
49.42	49.65	0.23	Rangeland/Native
49.65	49.93	0.28	Non-Irrigated
49.93	50.05	0.12	Right of way
50.05	52.39	2.34	Non-Irrigated
52.39	52.74	0.35	Rangeland/Native
52.74	52.77	0.04	Right of way
52.95	53.26	0.31	Rangeland/Native
53.26	53.78	0.52	Non-Irrigated
53.78	53.91	0.12	Rangeland/Native
53.91	54.03	0.12	Non-Irrigated
54.03	54.10	0.07	Rangeland/Native
54.10	54.15	0.05	Non-Irrigated
54.15	54.24	0.09	Rangeland/Native
54.24	57.08	2.84	Non-Irrigated
57.08	57.12	0.04	Residential
57.12	57.19	0.07	Right of way
57.19	57.86	0.67	Non-Irrigated
57.86	57.95	0.09	Rangeland/Native
57.95	58.04	0.08	Riparian
58.04	58.17	0.13	Non-irrigated
58.17	58.25	0.08	Rangeland/Native
58.25	58.33	0.09	Riparian
58.33	58.37	0.04	Rangeland/Native
58.37	58.46	0.09	Non-Irrigated
58.46	58.49	0.03	Rangeland/Native
58.49	58.53	0.03	Non-Irrigated
58.53	59.78	1.26	Irrigated
59.78	60.69	0.91	Non-Irrigated
60.69	61.46	0.77	Rangeland/Native
61.46	62.08	0.62	Non-Irrigated

Appendix H-2
Land Use Categories Crossed By Alternative 3

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
62.08	62.30	0.22	Rangeland/Native
62.30	62.41	0.11	Riparian
62.41	62.48	0.07	Rangeland/Native
62.48	62.83	0.36	Irrigated
62.83	62.86	0.03	Riparian
62.86	65.01	2.15	Non-Irrigated
65.01	65.11	0.10	Rangeland/Native
65.11	65.45	0.34	Non-Irrigated
65.45	65.49	0.04	Rangeland/Native
65.49	65.74	0.25	Non-Irrigated
65.74	66.00	0.26	Rangeland/Native
66.00	66.04	0.04	Non-Irrigated
66.04	66.24	0.20	Irrigated
66.24	66.31	0.07	Non-Irrigated
66.31	66.36	0.05	Rangeland/Native
66.36	66.52	0.16	Non-Irrigated
66.52	66.78	0.25	Irrigated
66.78	66.84	0.06	Rangeland/Native
66.84	66.92	0.09	Non-Irrigated
66.92	66.96	0.04	Rangeland/Native
66.96	67.12	0.16	Riparian
67.12	67.15	0.03	Rangeland/Native
67.15	67.19	0.04	Riparian
67.19	67.53	0.34	Rangeland/Native
67.53	67.61	0.08	Riparian
67.61	68.46	0.85	Irrigated
68.46	68.52	0.06	Residential
68.52	69.21	0.69	Non-Irrigated
69.21	69.24	0.03	Riparian
69.24	69.33	0.09	Non-Irrigated
69.33	69.48	0.15	Rangeland/Native
69.48	70.35	0.87	Non-Irrigated
70.35	70.40	0.05	Rangeland/Native
70.40	70.58	0.18	Irrigated

Appendix H-2
Land Use Categories Crossed By Alternative 3

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
70.58	70.65	0.08	Non-Irrigated
70.65	71.46	0.81	Irrigated
71.46	71.50	0.04	Riparian
71.50	71.52	0.02	Non-Irrigated
71.52	72.42	0.90	Irrigated
72.42	73.18	0.76	Non-Irrigated
73.18	73.94	0.77	Irrigated
73.94	74.26	0.32	Non-Irrigated
74.26	74.48	0.22	Rangeland/Native
74.48	75.01	0.53	Non-Irrigated
75.01	75.03	0.03	Riparian
75.03	75.52	0.49	Non-Irrigated
75.52	75.59	0.07	Rangeland/Native
75.59	75.62	0.02	Riparian
75.62	75.69	0.07	Rangeland/Native
75.69	75.71	0.02	Riparian
75.71	75.84	0.13	Rangeland/Native
75.84	78.53	2.68	Non-Irrigated
78.53	78.72	0.19	Rangeland/Native
78.72	79.45	0.73	Non-Irrigated
79.45	79.52	0.07	Rangeland/Native
79.52	79.69	0.17	Irrigated
79.69	79.72	0.02	Riparian
79.72	79.82	0.11	Irrigated
79.82	79.97	0.14	Non-Irrigated
79.97	80.92	0.95	Irrigated
80.92	83.23	2.31	Non-Irrigated
83.23	84.22	0.99	Rangeland/Native
84.22	84.31	0.08	Forest
84.31	84.41	0.10	Water
84.41	84.53	0.11	Rangeland/Native
84.53	85.22	0.70	Non-Irrigated
85.22	85.25	0.03	Residential
85.25	86.60	1.35	Non-Irrigated

Appendix H-2
Land Use Categories Crossed By Alternative 3

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
86.60	86.84	0.24	Rangeland/Native
86.84	87.41	0.58	Non-Irrigated
87.41	93.49	6.08	Rangeland/Native
93.49	94.52	1.03	Non-Irrigated
94.52	94.61	0.08	Right of way
94.61	97.14	2.54	Non-Irrigated
97.14	97.30	0.16	Riparian
97.30	97.57	0.26	Non-Irrigated
97.57	97.68	0.11	Riparian
97.68	106.03	8.36	Non-Irrigated
106.03	107.28	1.25	Rangeland/Native
107.28	111.38	4.10	Non-Irrigated
111.38	111.65	0.26	Rangeland/Native
111.65	111.80	0.16	Non-Irrigated
111.80	113.33	1.52	Rangeland/Native
113.33	113.82	0.49	Non-Irrigated
113.82	114.07	0.25	Rangeland/Native
114.07	115.17	1.11	Non-Irrigated
115.17	115.40	0.22	Rangeland/Native
115.40	116.97	1.57	Non-Irrigated
116.97	117.23	0.26	Rangeland/Native
117.23	117.93	0.70	Non-Irrigated
117.93	117.96	0.03	Riparian
117.96	118.49	0.52	Rangeland/Native
118.49	121.31	2.82	Non-Irrigated
121.31	121.34	0.03	Rangeland/Native
0.00	121.34	121.34	Miles

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
0.00	0.13	0.13	Non-Irrigated
0.13	0.73	0.61	Rangeland/Native
0.73	0.78	0.05	Riparian
0.78	0.87	0.09	Rangeland/Native
0.87	3.15	2.28	Non-Irrigated
3.15	3.96	0.81	Rangeland/Native
3.96	4.04	0.08	Non-Irrigated
4.04	4.85	0.81	Rangeland/Native
4.85	5.09	0.24	Non-Irrigated
5.09	5.46	0.38	Rangeland/Native
5.46	5.52	0.05	Non-Irrigated
5.52	5.80	0.28	Rangeland/Native
5.80	5.81	0.02	Riparian
5.81	6.01	0.20	Non-Irrigated
6.01	7.28	1.26	Rangeland/Native
7.28	7.45	0.17	Non-Irrigated
7.45	8.05	0.60	Rangeland/Native
8.05	8.06	0.01	Riparian
8.06	9.94	1.88	Rangeland/Native
9.94	9.95	0.01	Right of Way
9.95	10.09	0.14	Rangeland/Native
10.09	10.24	0.15	Agriculture
10.24	11.98	1.74	Rangeland/Native
11.98	12.40	0.42	Non-Irrigated
12.40	12.76	0.36	Rangeland/Native
12.76	12.96	0.20	Agriculture
12.96	14.65	1.69	Rangeland/Native
14.65	15.12	0.47	Non-Irrigated
15.12	15.21	0.09	Rangeland/Native
15.21	15.50	0.29	Non-Irrigated
15.50	15.72	0.22	Agriculture
15.72	15.76	0.04	Right of Way
15.76	19.72	3.95	Non-Irrigated

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
19.72	21.54	1.81	Rangeland/Native
21.54	21.85	0.31	Agriculture
21.85	21.93	0.08	Rangeland/Native
21.93	21.95	0.02	Riparian
21.95	22.78	0.83	Rangeland/Native
22.78	22.82	0.05	Riparian
22.82	23.30	0.48	Rangeland/Native
23.30	23.31	0.01	Riparian
23.31	23.39	0.08	Rangeland/Native
23.39	23.75	0.36	Agriculture
23.75	23.79	0.03	Riparian
23.79	24.09	0.30	Agriculture
24.09	25.11	1.02	Non-Irrigated
25.11	26.27	1.16	Rangeland/Native
26.27	26.71	0.44	Agriculture
26.71	26.82	0.11	Rangeland/Native
26.82	27.26	0.44	Agriculture
27.26	29.21	1.95	Non-Irrigated
29.21	29.24	0.03	Riparian
29.24	30.15	0.92	Non-Irrigated
30.15	30.20	0.05	Rangeland/Native
30.20	30.25	0.05	Non-Irrigated
30.25	30.29	0.04	Right of Way
30.29	30.47	0.19	Non-Irrigated
30.47	30.57	0.10	Rangeland/Native
30.57	31.00	0.43	Non-Irrigated
31.00	31.06	0.06	Rangeland/Native
31.06	31.94	0.88	Non-Irrigated
31.94	31.97	0.03	Rangeland/Native
31.97	31.99	0.02	Riparian
31.99	32.03	0.04	Rangeland/Native
32.03	32.46	0.43	Non-Irrigated
32.46	32.51	0.05	Riparian
32.51	34.64	2.13	Non-Irrigated

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
34.64	34.71	0.07	Rangeland/Native
34.71	36.17	1.46	Non-Irrigated
36.17	36.40	0.24	Rangeland/Native
36.40	36.42	0.01	Riparian
36.42	36.43	0.01	Rangeland/Native
36.43	36.46	0.03	Riparian
36.46	36.68	0.23	Rangeland/Native
36.68	37.26	0.58	Non-Irrigated
37.26	37.38	0.12	Rangeland/Native
37.38	37.39	0.01	Riparian
37.39	37.52	0.13	Rangeland/Native
37.52	37.85	0.33	Non-Irrigated
37.85	37.99	0.14	Agriculture
37.99	38.37	0.37	Rangeland/Native
38.37	38.41	0.04	Forest
38.41	38.49	0.08	Riparian
38.49	38.54	0.05	Non-Irrigated
38.54	38.88	0.34	Rangeland/Native
38.88	39.07	0.19	Non-Irrigated
39.07	39.42	0.35	Rangeland/Native
39.42	39.71	0.29	Non-Irrigated
39.71	40.14	0.43	Rangeland/Native
40.14	40.61	0.47	Non-Irrigated
40.61	41.11	0.50	Rangeland/Native
41.11	41.24	0.13	Non-Irrigated
41.24	41.34	0.11	Rangeland/Native
41.34	41.62	0.28	Non-Irrigated
41.62	41.69	0.07	Rangeland/Native
41.69	49.85	8.15	Non-Irrigated
49.85	49.88	0.03	Riparian
49.88	55.78	5.88	Non-Irrigated
55.78	55.81	0.04	Rangeland/Native
55.81	59.00	3.18	Non-Irrigated
59.00	59.26	0.26	Rangeland/Native

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
59.26	60.26	0.99	Non-Irrigated
60.26	60.28	0.02	Right of Way
60.28	60.41	0.13	Non-Irrigated
60.41	60.47	0.06	Rangeland/Native
60.47	60.48	0.01	Riparian
60.48	60.52	0.04	Rangeland/Native
60.52	60.55	0.03	Riparian
60.55	60.64	0.09	Rangeland/Native
60.64	61.22	0.58	Non-Irrigated
61.22	61.27	0.05	Rangeland/Native
61.27	61.29	0.03	Non-Irrigated
61.29	62.30	1.01	Irrigated
62.30	62.57	0.27	Non-Irrigated
62.57	62.80	0.23	Irrigated
62.80	62.90	0.10	Rangeland/Native
62.90	63.00	0.10	Riparian
63.00	63.06	0.06	Rangeland/Native
63.06	63.40	0.34	Non-Irrigated
63.40	63.86	0.46	Irrigated
63.86	64.75	0.89	Non-Irrigated
64.75	64.88	0.13	Rangeland/Native
64.88	65.29	0.41	Non-Irrigated
65.29	65.43	0.13	Rangeland/Native
65.43	65.46	0.03	Non-Irrigated
65.46	65.61	0.15	Rangeland/Native
65.61	66.65	1.04	Non-Irrigated
66.65	66.75	0.10	Rangeland/Native
66.75	66.88	0.13	Non-Irrigated
66.88	67.39	0.52	Rangeland/Native
67.39	69.80	2.40	Non-Irrigated
69.80	69.92	0.12	Rangeland/Native
69.92	69.98	0.06	Agriculture
69.98	70.12	0.14	Rangeland/Native
70.12	70.41	0.29	Non-Irrigated

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
70.41	71.94	1.53	Rangeland/Native
71.94	71.95	0.01	Right of Way
71.95	72.51	0.55	Rangeland/Native
72.51	72.59	0.09	Right of Way
72.59	72.75	0.16	Rangeland/Native
72.75	72.77	0.02	Right of Way
72.77	72.85	0.08	Non-Irrigated
72.85	72.87	0.02	Rangeland/Native
72.87	72.90	0.03	Riparian
72.90	73.36	0.46	Rangeland/Native
73.36	73.44	0.08	Non-Irrigated
73.44	73.48	0.03	Rangeland/Native
73.48	73.49	0.01	Right of Way
73.49	73.51	0.02	Rangeland/Native
73.51	73.56	0.05	Non-Irrigated
73.56	73.59	0.03	Rangeland/Native
73.59	73.59	0.01	Riparian
73.59	73.89	0.30	Rangeland/Native
73.89	73.96	0.07	Riparian
73.96	74.48	0.52	Rangeland/Native
74.48	74.49	0.01	Right of Way
74.49	75.21	0.72	Rangeland/Native
75.21	75.22	0.01	Right of Way
75.22	75.60	0.37	Rangeland/Native
75.60	75.60	0.00	Riparian
75.60	75.61	0.01	Rangeland/Native
75.61	75.62	0.00	Riparian
75.62	75.64	0.03	Rangeland/Native
75.64	75.65	0.00	Riparian
75.65	76.34	0.69	Rangeland/Native
76.34	76.39	0.05	Riparian
76.39	76.58	0.19	Rangeland/Native
76.58	76.82	0.24	Non-Irrigated
76.82	77.79	0.97	Rangeland/Native

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
77.79	77.80	0.01	Agriculture
77.80	78.44	0.63	Rangeland/Native
78.44	78.59	0.15	Agriculture
78.59	79.10	0.51	Rangeland/Native
79.10	79.34	0.24	Non-Irrigated
79.34	79.43	0.09	Rangeland/Native
79.43	79.73	0.30	Non-Irrigated
79.73	79.91	0.17	Rangeland/Native
79.91	80.12	0.21	Non-Irrigated
80.12	80.44	0.32	Rangeland/Native
80.44	80.45	0.01	Riparian
80.45	80.98	0.52	Rangeland/Native
80.98	81.00	0.02	Riparian
81.00	81.62	0.62	Rangeland/Native
81.62	81.66	0.04	Riparian
81.66	81.70	0.04	Rangeland/Native
81.70	81.71	0.02	Riparian
81.71	81.76	0.04	Rangeland/Native
81.76	81.97	0.21	Right of Way
81.97	83.21	1.24	Non-Irrigated
83.21	83.25	0.04	Right of Way
83.25	83.77	0.52	Rangeland/Native
83.77	86.14	2.36	Non-Irrigated
86.14	86.21	0.08	Rangeland/Native
86.21	86.41	0.20	Non-Irrigated
86.41	86.56	0.15	Rangeland/Native
86.56	86.59	0.03	Non-Irrigated
86.59	86.74	0.15	Rangeland/Native
86.74	86.83	0.09	Non-Irrigated
86.83	87.21	0.38	Rangeland/Native
87.21	87.29	0.07	Non-Irrigated
87.29	87.35	0.07	Rangeland/Native
87.35	87.41	0.06	Non-Irrigated
87.41	87.48	0.07	Rangeland/Native

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
87.48	87.52	0.04	Non-Irrigated
87.52	87.55	0.02	Rangeland/Native
87.55	87.61	0.06	Non-Irrigated
87.61	87.80	0.19	Rangeland/Native
87.80	87.92	0.11	Non-Irrigated
87.92	89.05	1.13	Rangeland/Native
89.05	89.30	0.25	Non-Irrigated
89.30	90.89	1.59	Rangeland/Native
90.89	91.94	1.05	Non-Irrigated
91.94	91.97	0.02	Rangeland/Native
91.97	92.28	0.31	Non-Irrigated
92.28	92.35	0.07	Rangeland/Native
92.35	93.83	1.48	Non-Irrigated
93.83	94.19	0.36	Rangeland/Native
94.19	94.34	0.15	Non-Irrigated
94.34	94.46	0.11	Rangeland/Native
94.46	94.86	0.40	Non-Irrigated
94.86	95.00	0.14	Irrigated
95.00	95.36	0.36	Rangeland/Native
95.36	97.96	2.59	Non-Irrigated
97.96	99.28	1.32	Rangeland/Native
99.28	99.36	0.08	Riparian
99.36	99.53	0.17	Rangeland/Native
99.53	99.70	0.17	Non-Irrigated
99.70	99.76	0.05	Rangeland/Native
99.76	99.90	0.15	Non-Irrigated
99.90	100.28	0.37	Rangeland/Native
100.28	101.50	1.22	Non-Irrigated
101.50	101.73	0.23	Rangeland/Native
101.73	102.35	0.62	Non-Irrigated
102.35	109.21	6.85	Rangeland/Native
109.21	109.54	0.33	Non-Irrigated
109.54	109.57	0.03	Agriculture
109.57	109.65	0.08	Right of Way

Appendix H-3
Land Use Categories Crossed By Alternative 4

Mile Post Begin	Mile Post End	Distance (Miles)	Land Use
109.65	112.14	2.49	Non-Irrigated
112.14	112.19	0.05	Agriculture
112.19	112.35	0.15	Riparian
112.35	112.62	0.27	Non-Irrigated
112.62	112.73	0.11	Riparian
112.73	120.08	7.34	Non-Irrigated
120.08	120.10	0.03	Riparian
120.10	120.93	0.82	Non-Irrigated
120.93	121.07	0.14	Agriculture
121.07	121.37	0.30	Non-Irrigated
121.37	122.57	1.20	Rangeland/Native
122.57	123.70	1.13	Non-Irrigated
123.70	123.75	0.05	Rangeland/Native
123.75	124.31	0.56	Non-Irrigated
124.31	124.57	0.26	Rangeland/Native
124.57	126.97	2.39	Non-Irrigated
126.97	126.99	0.02	Riparian
126.99	127.31	0.32	Non-Irrigated
127.31	127.45	0.14	Riparian
127.45	127.57	0.12	Rangeland/Native
127.57	128.00	0.43	Non-Irrigated
128.00	128.34	0.34	Rangeland/Native
128.34	129.58	1.24	Non-Irrigated
129.58	130.08	0.49	Agriculture
130.08	130.38	0.30	Non-Irrigated
130.38	130.41	0.03	Riparian
130.41	131.33	0.91	Non-Irrigated
131.33	134.25	2.92	Rangeland/Native
134.25	137.44	3.19	Non-Irrigated
137.44	137.49	0.05	Agriculture
137.49	137.51	0.02	Riparian
137.51	137.53	0.02	Agriculture
137.53	137.56	0.04	Riparian
137.56	137.68	0.12	Agriculture

Appendix H-3 Land Use Categories Crossed By Alternative 4			
Mile Post Begin	**Mile Post End**	**Distance (Miles)**	**Land Use**
137.68	137.81	0.13	Non-Irrigated
137.81	137.83	0.02	Rangeland/Native
137.83	137.89	0.06	Riparian
137.89	137.96	0.08	Rangeland/Native
137.96	138.01	0.05	Riparian
138.01	138.04	0.03	Rangeland/Native
138.04	139.54	1.50	Non-Irrigated
0.00	139.54	139.32	Total

APPENDIX I:
IMPAIRED RIVER SEGMENTS SUMMARY SHEETS

APPENDIX J:
SUMMARY OF SURFACE WATER RESOURCES AND WATER QUALITY

APPENDIX J-1
SUMMARY OF SURFACE WATER IN THE ANALYSIS AREA

Surface Water Body[a]	Number of Crossings[b]			Flow Measured at nearest crossing[c]	Stream Classification[d]	303(d) Status[e]	Water Quality Summary[f]	Percent of Analysis Area Containing SubBasin
	Alt 2	Alt 3	Alt 4					
Upper Missouri-Sun-Smith Basin (HUC 10030102)								10.0
Missouri River	NC	NC	NC	13,100 cfs (2005) Great Falls	B-2	5	Yes	
Black Horse Lake (west finger) 8 acres	1	1	NC	ND	Not classified	NL	No	
Benton Lake	NC	NC	NC	ND	B-3	5	Yes	
Unnamed Lake (22 acres)	NC	1	NC	ND	Not classified	NL	No	
Lake Creek	NC	NC	1	ND	B-3	5	No	
Teton River Basin (HUC 10030205)								18.4
Teton River	1	1	NC	547 cfs (2005) Chouteau	B-3	4A	Yes	
Muddy Creek	NC	NC	NC		B-2	3	Yes	
Marias River Basin (HUC 10030203)								54.7
Unnamed Lake (7 acres)	1	1	NC	ND	Not classified	NL	No	
Unnamed Lake (7.6 acres)	1	1	NC	ND	Not classified	NL	No	
Pondera Coulee	1	1	1	15 cfs (2005) Conrad	B-2	5	No	
Spring Coulee	66.8	62.5	66.8 (Alt 2)	173 cfs (1982) Power	B-2	3	No	
Dry Fork Marias	1	1	1	2,130 cfs (1986) Dupuyer	B-3	1	Yes	
Schultz Coulee	1	NC	1	ND	B-2	NL	No	
Bullhead Creek	1	1	1	ND	B-2	NL	No	
Big Flat Coulee	NC	NC	6	ND	B-2	NL	No	

APPENDIX J-1
SUMMARY OF SURFACE WATER IN THE ANALYSIS AREA

Surface Water Body[a]	Number of Crossings[b]			Flow Measured at nearest crossing[c]	Stream Classification[d]	303(d) Status[e]	Water Quality Summary[f]	Percent of Analysis Area Containing SubBasin
	Alt 2	Alt 3	Alt 4					
Little Flat Coulee	NC	NC	NC	ND	B-2	NL	No	54.7
Hilger Coulee	NC	NC	NC	ND	B-2	NL	No	
Sand Coulee	NC	NC	NC	ND	B-2	NL	No	
Rocky Springs Coulee	NC	NC	NC	ND	B-2	NL	No	
Buckley Coulee	NC	NC	NC	ND	B-2	NL	No	
Marias River[g]	1	1	1	5,160 cfs (2005) Shelby	B-2	2	Yes	
Two Medicine River Basin (HUC 10030201)								0.2
Two Medicine River	NC	NC	NC	ND	B-1	2 & 2A	Yes	
Cut Bank Creek Basin (HUC 10030202)								6.7
Cut Bank Creek	NC	NC	NC	4,060 cfs (2005) Cut Bank	B-2	5	Yes	
Old Maids Coulee	NC	NC	NC	ND	B-1	5 & 2B	Yes	
Spring Creek	NC	NC	NC	ND	B-1	NL	No	
Big Rock Coulee	NC	NC	NC	ND	B-1	NL	No	
Hay Lake (115 acres)	1	NC	1	ND	Not classified	NL	No	
Willow Creek Basin (HUC 10030204)								0.4
None crossed	NC	NC	NC	ND	B-2	2 & 2A	Yes	
Upper Milk River Basin (HUC 10050002)								6.7
Grassy Lake (160 acres)	1	NC	1	ND	Not classified	NL	No	
Red River	1	NC	1	ND	B-1	NL	No	
Red River	1	NC	1	ND	B-1	NL	No	
Red River	1	NC	1	ND	B-1	NL	No	
Unnamed Lake (40 acrea)	NC	1	NC	ND	Not classified	NL	No	
Unnamed Lake (63 acres)	NC	1	NC	ND	Not classified	NL	No	

APPENDIX J-1
SUMMARY OF SURFACE WATER IN THE ANALYSIS AREA

Surface Water Body[a]	Number of Crossings[b]			Flow Measured at nearest crossing[c]	Stream Classification[d]	303(d) Status[e]	Water Quality Summary[f]	Percent of Analysis Area Containing SubBasin
	Alt 2	Alt 3	Alt 4					
Total Stream/River Crossings	10	6	17					
Total Pond/Lake Crossings	4	6	2					
Total Crossings	14	12	19					

Notes

Alt = alternative
cfs = cubic feet per second
NA = Not Applicable
NC = No Crossing
ND= No Data
NL= Not Listed on the 303(d) list

[a] This table lists all perennial streams and rivers in the analysis area, as well as, all ponds or lakes greater than 5 acres that would be crossed by one or more alternatives.

[b] Numbers in each column are the number of crossings for each surface water body per alternative.

[c] Flow measured at nearest crossing is from the U.S. Geological data base (USGS 2006). Stream flow measurement shown in this table is typically annual peak flow or near peak flow in cubic feet per second (cfs). Year and location for measurement are noted.

[d] Stream Classification Explanation

- A-CLOSED. Waters classified A-Closed are suitable for drinking, culinary, and food processing purposes after simple disinfection.
- A-1. Waters classified A-1 are suitable for drinking, culinary, and food processing purposes after conventional treatment for removal of naturally present impurities.
- B-1. Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.
- B-2. Waters classified B-2 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.
- B-3. Waters classified B-3 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

- C-1. Waters classified C-1 are suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.
- C-2. Waters classified C-2 are suitable for bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.
- C-3. Waters classified C-3 are suitable for bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers. The quality of these waters is naturally marginal for drinking, culinary and food processing purposes, agriculture, and industrial water supply.

[e] Categorization of Surface Waters for 303(d) Listing

As of 2004, the EPA has requested that states adopt a five-part scheme for categorizing the assessment status of all waters in each state's water quality monitoring and assessment system. These five categories are used as follows:

- Category 1: Waters for which all applicable beneficial uses have been assessed and all uses are determined to be fully supported.
- Category 2: Waters for which available data and/or information indicate that some, but not all, of the beneficial uses are supported.
    - Subcategory 2A: Available data and/or information indicate that some, but not all, of the beneficial uses are supported.
- Category 3: Waters for which there are insufficient data to assess the use support of any applicable beneficial use, so no use support determinations have been made.
- Category 4: Waters where one or more beneficial uses have been assessed as being impaired, fully supporting but threatened, all TMDLs are completed but impaired beneficial uses have not yet achieved fully supporting status, or impaired and TMDLs are not required:
    - Subcategory 4A: All TMDLs needed to rectify all identified threats or impairments have been completed and approved.
    - Subcategory 4B: Waterbodies are on lands where "other pollution control requirements required by local, state, or federal authority" [see 40 CFR 130.7(b)(1)(iii)] are in place, are expected to address all waterbody-pollutant combinations, and attain all water quality standards in a reasonable period of time. These control requirements act "in lieu of" a TMDL, thus no actual TMDLs are required.
    - Subcategory 4C: Identified threats or impairments result from pollution categories such as dewatering or habitat modification and, thus, the calculation of a TMDL is not required.
- Category 5: Waters where one or more applicable beneficial uses have been assessed as being impaired or threatened and a TMDL is required to address the factors causing the impairment or threat.

[f] All available water quality summaries for surface water in the analysis area are provided in Appendix 3.5.

[g] The Marias River is shown as a Category 1 stream on the Draft 2006 DEQ Water Quality Report.

APPENDIX K:
PRIORITY POLLUTANT MONITORING DATA

APPENDIX K-1
CRITERIA POLLUTANT MONITORING DATA
PM_{10}, $PM_{2.5}$, SO_2, and CO

Site	Year	PM_{10}		$PM_{2.5}$		SO_2		CO	
		Annual Mean (µg/m³)	24-Hour High (µg/m³)	Annual Mean (µg/m³)	24-Hour High (µg/m³)	Annual Mean (ppm)	24-Hour High (ppm)	Annual Mean (ppm)	8-Hour High (ppm)
Great Falls, Montana									
ID: 300130001 NW Corner 10th Ave and 2nd Street Intersection	1996	--	--	--	--	--	--	--	--
	1997	--	--	--	--	--	--	--	--
	1998	--	--	--	--	--	--	--	--
	1999	--	--	--	--	--	--	--	--
	2000	--	--	--	--	--	--	--	--
	2001	--	--	--	--	--	--	--	4.6
	2002	--	--	--	--	--	--	--	3
	2003	--	--	--	--	--	--	--	2.9
	2004	--	--	--	--	--	--	--	3.2
	2005	--	--	--	--	--	--	--	2.0
ID: 300130002 7 Miles NE of Malmstrom AFB	1996	--	--	--	--	--	--	--	--
	1997	--	--	--	--	--	--	--	--
	1998	--	--	--	--	--	--	--	--
	1999	--	--	--	--	--	--	--	--
	2000	--	--	--	--	--	--	--	--
	2001	--	--	--	--	--	--	--	--
	2002	--	--	--	--	--	--	--	--
	2003	--	--	--	--	--	--	--	--
	2004	5	13	--	--	--	--	--	--
	2005	9	26	--	--	--	--	--	--
ID: 300130009 Fire Station 9th Street and 1st Ave S	1996	19	69	--	--	--	--	--	--
	1997	20	62	--	--	--	--	--	--
	1998	--	--	--	--	--	--	--	--
	1999	--	--	--	--	--	--	--	--
	2000	--	--	--	--	--	--	--	--
	2001	--	--	--	--	--	--	--	--
	2002	--	--	--	--	--	--	--	--
	2003	--	--	--	--	--	--	--	--
	2004	--	--	--	--	--	--	--	--
	2005	--	--	--	--	--	--	--	--

APPENDIX K-1
CRITERIA POLLUTANT MONITORING DATA
PM_{10}, $PM_{2.5}$, SO_2, and CO

Site	Year	PM_{10}		$PM_{2.5}$		SO_2		CO	
		Annual Mean (µg/m³)	24-Hour High (µg/m³)	Annual Mean (µg/m³)	24-Hour High (µg/m³)	Annual Mean (ppm)	24-Hour High (ppm)	Annual Mean (ppm)	8-Hour High (ppm)
ID: 300131025 Skyway Conoco 700 10th Ave S	1996	--	--	--	--	--	--	--	8.5
	1997	--	--	--	--	--	--	--	7.4
	1998	--	--	--	--	--	--	--	5.3
	1999	--	--	--	--	--	--	--	3.6
	2000	--	--	--	--	--	--	--	4.6
	2001	--	--	--	--	--	--	--	3.9
	2002	--	--	--	--	--	--	--	--
	2003	--	--	--	--	--	--	--	--
	2004	--	--	--	--	--	--	--	--
	2005	--	--	--	--	--	--	--	--
ID: 300131026 Great Falls HS 3rd South and 17th East	1996	--	--	--	--	--	--	--	--
	1997	--	--	--	--	--	--	--	--
	1998	--	--	--	--	--	--	--	--
	1999	--	--	--	--	--	--	--	--
	2000	--	--	7.5	40	--	--	--	--
	2001	--	--	5.4	33	--	--	--	--
	2002	--	--	5.3	19	--	--	--	--
	2003	--	--	7.5	61	--	--	--	--
	2004	--	--	4.5	21	--	--	--	--
	2005	--	--	5.9	20	--	--	--	--
ID: 300132000 MT Refining @ Wire Mill Road	1996	--	--	--	--	0.004	0.021	--	--
	1997	--	--	--	--	0.003	0.016	--	--
	1998	--	--	--	--	0.003	0.012	--	--
	1999	--	--	--	--	0.003	0.012	--	--
	2000	--	--	--	--	0.003	0.009	--	--
	2001	--	--	--	--	--	--	--	--
	2002	--	--	--	--	--	--	--	--
	2003	--	--	--	--	--	--	--	--
	2004	--	--	--	--	--	--	--	--
	2005	--	--	--	--	--	--	--	--

APPENDIX K-1
CRITERIA POLLUTANT MONITORING DATA
PM_{10}, $PM_{2.5}$, SO_2, and CO

Site	Year	PM_{10}		$PM_{2.5}$		SO_2		CO	
		Annual Mean (µg/m^3)	24-Hour High (µg/m^3)	Annual Mean (µg/m^3)	24-Hour High (µg/m^3)	Annual Mean (ppm)	24-Hour High (ppm)	Annual Mean (ppm)	8-Hour High (ppm)
ID: 300132001 1301 27th Ave NE Black Eagle Race Track	1996	--	--	--	--	--	--	--	--
	1997	--	--	--	--	--	--	--	--
	1998	--	--	--	--	--	--	--	--
	1999	--	--	--	--	--	--	--	--
	2000	--	--	--	--	0.004	0.027	--	--
	2001	--	--	--	--	0.006	0.057	--	--
	2002	--	--	--	--	0.004	0.041	--	--
	2003	--	--	--	--	0.003	0.029	--	--
	2004	--	--	--	--	0.003	0.024	--	--
	2005	--	--	--	--	0.003	0.028	--	--
Browning, Montana									
ID: 300350101 Blackfeet Transit Bldg 34	1996	28	61	--	--	--	--	--	--
	1997	47	135	--	--	--	--	--	--
	1998	36	107	--	--	--	--	--	--
	1999	26	87	--	--	--	--	--	--
	2000	20	130	--	--	--	--	--	--
	2001	22	75	--	--	--	--	--	--
	2002	29	117	--	--	--	--	--	--
	2003	24	190	--	--	--	--	--	--
	2004	15	30	--	--	--	--	--	--
	2005	13	21	--	--	--	--	--	--
ID: 300350102 Blackfeet Industrial Park	1996	11	26	--	--	--	--	--	--
	1997	8	18	--	--	--	--	--	--
	1998	--	--	--	--	--	--	--	--
	1999	--	--	--	--	--	--	--	--
	2000	--	--	--	--	--	--	--	--
	2001	--	--	--	--	--	--	--	--
	2002	--	--	--	--	--	--	--	--
	2003	--	--	--	--	--	--	--	--
	2004	--	--	--	--	--	--	--	--
	2005	--	--	--	--	--	--	--	--

Notes:

PM_{10}	Particulate Matter < 10 Microns
$PM_{2.5}$	Particulate Matter < 2.5 Microns
µg/m^3	micrograms per cubic meter
ppm	parts per million

Source: EPA 2006a

APPENDIX L:
PHOTOGRAPHIC SIMULATIONS

APPENDIX L

Photographic Simulations

Technical information on the generation of photographic simulations is provided here. Computer Aided Design (CAD), Geographic Information System (GIS), and 3-dimensional (3-D) modeling and design software, Global Positioning Systems (GPS) equipment, a Digital Single Lens Reflex (dSLR) camera, and direct conversations with individuals responsible for transmission line pole design were used to prepare the photograph simulations. Photographs were taken in the field at the defined viewpoint locations and used as backgrounds in the computer generated images. Several 3-D models were constructed of the topography and transmission line poles. Pole placement was performed using GIS software. The computer camera placed the poles in the 3-D model at the appropriate location and the images were generated.

On-site GPS data were obtained using the Pharos GPS Pocket Navigator package for a hand-held Dell Axim 51 PDA. Data recorded included date, time of day, latitude, longitude, elevation, and heading. Heading was verified with a hand-held compass. On-site photographs were acquired using a Canon 350D dSLR (1.6 crop factor) and a Canon 18-55 mm zoom lens. Camera information recorded and verified from photograph EXIF information included: film speed, focal length, aperture, and shutter speed. Photographs were saved as both unprocessed data from the image sensor and in a compressed format.

Montana Digital Elevation Model (DEM) data were obtained from the National Elevation Dataset (NED) as of April 2002 for each of the viewpoints. The data used included 30-meter X-Y resolution and one foot resolution in the Z-plane. Horizontal datum is North American Datum of 1927 (NAD27) with a transverse mercator projection, and National Geodetic Vertical Datum (NGVD) 1929 vertical datum.

The proposed transmission line route was presented in the MFSA application (MATL 2006b). The transmission line map datum was converted to NAD27, so that the line could be exported and then re-imported into the 3-D modeling software and aligned with the NAD27 based DEMs. Transmission line and proposed pole specifications and details were obtained from SNC-Lavalin ATP Inc. (2006). Scaled 3-D models were constructed for each of the proposed power pole types and placed into the 3-D model along the proposed transmission line alignment using specified or recommended span distances between poles. Typical conductor and ground cable sag specifications were used unless otherwise specified by SNC-Lavalin.

For each simulation, the photograph taken in the field was imported into the 3-D modeling software package and loaded as a background environment within which the view of the 3-D model is generated. To generate the correct view relative to the actual photograph, a software camera was placed at a location identical to where the photograph was taken relating the field location to the DEM location. Using the JEEEP.com coordinate translation applet, GPS recorded camera locations were converted to Universal Transverse Projection (UTM) northing and easting locations to facilitate placement of the software camera.

APPENDIX M:

MATL SYSTEM IMPACT STUDY STAND-ALONE AND CO-EXISTING (NOT YET AVAILABLE)

500 copies of this public document were published at an estimated cost of $33.27 per copy, for a total cost of $16,635, which includes $14,585 for printing and $2,050 for distribution.